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The
British Fern Gazette.

VOLUME VI.

EDITED BY

F. W. STANSFIELD, M.D., F.L.S.
(READING).

SMITHSONIAN INSTITUTION
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JUL 10 1935
NATIONAL MUSEUM

PUBLISHED BY

The British Pteridological Society.

President: Mr. W. B. Cranfield, F.R.H.S., F.L.S.

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December, 1929.

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F. W. STANSFIELD, M.D., F.L.S.

(120, OXFORD ROAD, READING.)

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THE BRITISH PTERIDOLOGICAL SOCIETY

President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, "Monkhams," Lower Road, Great Bookham, Surrey.

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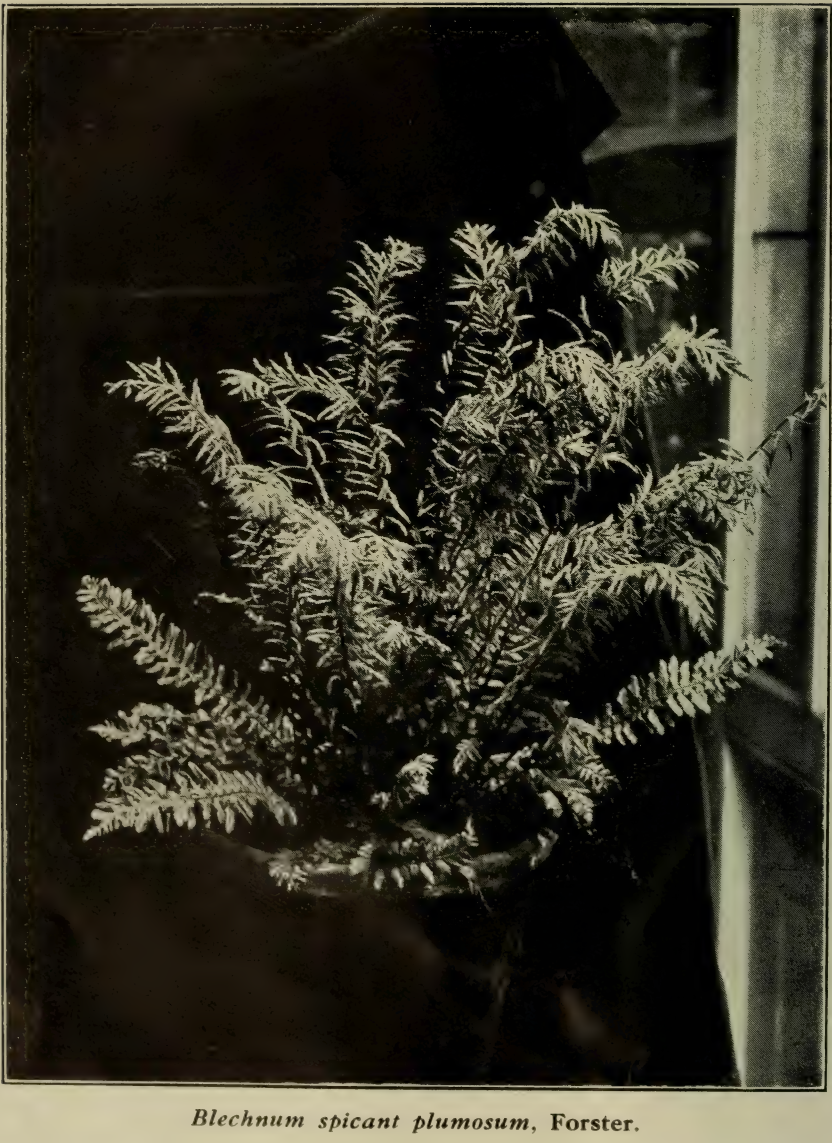

Blechnum spicant plumosum, Forster.

THE
BRITISH FERN GAZETTE.
NEW SERIES.

Vol. VI. DECEMBER, 1929. No. 1

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EDITORIAL NOTES.

We have received the following communication from the Editor of the American Fern Journal, whose greetings we heartily reciprocate on behalf of the Society :—

"The American Fern Society sends greetings to the members of the British Pteridological Society. While in general our particular interests in ferns are along somewhat different lines we have more in common than in difference ; for example, it happens that, whereas you have been concerned for a long time with the development of the interesting varieties of the Hart's Tongue Fern, our chief interest in this country has been devoted to an effort to maintain this species as an element in our native flora. The conservation of our native plants—their maintenance in natural habitats—has been a matter of increasing concern with us for at least a quarter of a century."

In our last issue we made reference to the matter above mentioned both as applied to our own country and to the continent of America.

In the present number Mr. Thorrington completes his review of Professor Bower's new book on "The Ferns." No doubt our more scientifically-minded members who have not already made the acquaintance of this monumental work are looking forward to the opportunity of studying it in detail for themselves. It may prove too strong meat for those who are mainly, if not entirely, horticulturists and who grow ferns only in order to enjoy their beauty. There is, however, more than this purely aesthetic satisfaction to be got out of fern-growing and fern study. We can, at least, all thank the author for the book itself and Mr. Thorrington for his able introduction to it.

The Editor regrets that he was prevented from attending the Annual Meeting, and from taking part in the subsequent excursions by an accident which put him out of commission for several weeks. Fortunately there were no permanent bad effects of the mishap. He is deeply grateful to those members, and other friends, whose help and sympathy were so valuable both at the time and during convalescence.

Sir Frederick W. Moore, V.M.H., F.L.S., of Rathfarnham, Co. Dublin, has accepted, with thanks, the honorary membership to which he was elected at the Annual Meeting.

The Hon. Treasurer, Mr. J. J. Sheldon, will be glad to receive remittances of any subscriptions for the current year (now due) or any arrears which may remain unpaid.

OUR FRONTISPIECE.

Blechnum spicant plumosum, Forster.

The origin of this fern was involved for many years in some degree of mystery. It was first brought before the Society in 1924 by Mr. W. Forster, then of Salford and since deceased, the history being that he had sown a lot of "old spores" of which he had lost or forgotten the name. The result was a considerable crop of this, apparently quite a new form. It is probable that there were other varieties in the batch, but these seem to have been neglected or discarded as inferior things. When exhibited the fern showed, in addition to the foliose and bipinnatifid character, a slight amount of cruciation and, at the request of the raiser, it was named *Blechnum spicant cruciato-plumosum*, Forster. Subsequent cultivation, however, showed that the cruciate character was, at most, only occasional and very partial, and that the fern was better without it, so the *cruciato-* was eventually dropped and the sufficiently descriptive title of *plumosum* alone retained. The frontispiece is from a photograph, taken several years ago, of a plant in the Editor's own collection. A curious thing subsequently happened—the plant divided into two crowns, one of which retained its character, while the other sported into the likeness of Airey's serratum No. 2, thereby affording a significant suggestion as to the origin of *plumosum* itself. The part which remained true died as the result of the severe weather in the early part of this year, but fortunately we have been able to re-obtain the variety from Messrs. Perry, of Enfield. The variety has now become rare, and it is time that a fresh crop should be raised from spores. We are not aware that this has been done since the original batch came into being more than thirty years ago.

THE ANNUAL MEETING.

The Thirty-fourth Annual Meeting of the Society was held on Monday, September 2nd, at the Ingleborough Hotel, Ingleton, Yorks, the President, Mr. W. B. Cranfield, occupying the Chair. Members were present from Enfield, Horsham, London, Great Bookham, Welwyn, Warlingham (Surrey), Halstead (Essex), Dublin, Haslingden, Lancaster, Grange, and Edinburgh.

In opening the Meeting the President referred, in feeling terms, to an accident which had befallen Dr. F. W. Stansfield on the previous Saturday. (While hunting for ferns on the slopes of Ingleborough the Doctor had slipped in getting over a wall and a large sharp-edged stone from the wall had fallen upon him and injured his back. Fortunately he was able, with assistance, to walk to the hotel. A rib had been broken and he was removed to a nursing home in Lancaster on Sunday. His absence, and its cause, cast a gloom over the members, but during the Meeting they were greatly cheered to receive a message from Lancaster that he was fairly comfortable and that there appeared to be no complications.) A cordial resolution of sympathy was unanimously passed and sent to the Hon. Secretary.

The Minutes of the previous Meeting were read, confirmed, and signed by the President. The President read the Hon. Secretary's Report, as follows :—

" Mr. President, Ladies and Gentlemen,

The number of ordinary members of the Society is now 126 and there are eight honorary members.

Mr. W. A. Bilney, of Newbury, Berks, Mr. E. H. Wilding, of Stoke Poges, Bucks, and Mrs. Alfred Hollington, of Potters Bar, Middlesex, have resigned their membership.

Mr. R. A. Martindale, J.P., of Boston Spa, Yorks, and Sir Archibald Buchan-Hepburn, Bart., of Prestonkirk, Scotland, have died. Although these gentlemen did not attend the Meetings of the Society they took a lively interest in its work and were both valuable members, whose loss we must all deplore.

Twelve new members have joined the Society since the last Annual Meeting and their names will be found recorded in the two succeeding issues of the *Gazette*, with the exception of that of Mr. Denis J. Doody, of the Gardens, Mucross Abbey, Killarney, Ireland, who joined only a month ago.

The normal activities of the Society have been greatly restricted by the severity of the last winter, and the extreme drought of the following period. It has been a continuous struggle for many members to keep their plants alive and, even in this, they have not always succeeded. The ferns, found around Sherborne at the time of our last Meeting, have barely survived and many other valuable things have been lost.

Our President delivered a lecture, illustrated by lantern slides and specimens of cut fronds, before the Royal Horticultural Society on July 16th. Several of our own members were present, but the Meeting was somewhat thinly attended, although those present showed their appreciation by their comments and interest."

The Hon. Treasurer presented his annual statement as follows :—

BALANCE SHEET.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance from last year	43	11	0	Affiliation Fee to R.H.S.	2	2	0
Subscriptions ...	47	15	3	" Gazette," Dec., 1928	13	2	6
Sale of " Gazettes "		6	0	,, June, 1929	15	0	0
Advertisements ...	2	2	0	Leaflets in R.H.S. Journal	13	10	2
Plate for December " Gazette " (given by Mr. T. B. Blow)	1	2	6	Postages & Sundries	2	8	3
				Balance in Bank ...	48	13	10
	£94	16	9		£94	16	9

Audited and found correct, September 2nd, 1929.

(Signed) PERCY GREENFIELD.

Upon this statement the President expressed his regret that the leaflet, issued with the R.H.S. Journal, had, so far, proved to be a great disappointment as not more than two or three members had joined as a result of it. The members present unanimously agreed that such a result could not have been foreseen, that there had appeared to be every prospect of a successful result, and that seed might have been sown which had not yet shown itself above ground. The balance sheet was then passed without further comment, on the proposal of Mr. Whiteside, seconded by Mr. Stephens.

The President was unanimously re-elected after Mr. Blow and Mr. Whiteside had expressed the Society's great appreciation of his constant and invaluable support and the enthusiasm with which he used his influential position in the horticultural world to further the Society's interests.

The Officers and Committee for the ensuing year were elected as per the following list :—

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. Alex. Cowan,
Mr. T. E. Henwood,
Rev. Canon Hawkins,
Rev. Canon Kingsmill Moore,
Mr. J. J. Smithies,
Mr. G. E. Stephens.

Hon. Treasurer :

Mr. J. J. Sheldon.

Hon. Secretary and Editor of The Gazette :

Dr. F. W. Stansfield.

Hon. Auditor :

Mr. P. Greenfield.

Committee :

Mr. T. B. Blow,
Mr. Robert Bolton,
Mr. Thos. Brown,
Mr. P. Greenfield,
Mr. A. J. MacSelf,
Dr. S. P. Rowlands,
Dr. T. Stansfield,
Mr. A. J. Sinclair,
Mr. F. W. Thorrington,
Mr. R. Whiteside.

The following new members were elected to the Society :—

Mr. Morsdell, East Lodge Gardens, Enfield Chase.
Mr. Frank Butler, 2, Prospect Street, Reading.
Mr. John Lovelady, 129, Manchester Road, Haslingden, Lancs.

Mr. J. E. Hughes, Lee Hall, Mollington, near Chester.
Mr. George Percy Gill, Head Master, Bentham Grammar School, Bentham, Yorks.
Mr. Frank Bouskell, Sedgemere, Market Bosworth, Leicestershire.

It was resolved that Sir Frederick W. Moore, F.L.S., should be invited to become an honorary member of the Society.

The President suggested that the Secretary be empowered to express to the authorities of the Southport Show the Society's appreciation of their enterprise in regard to the exhibition of British Ferns. This was carried *nem. con.*

New Certificates.—The President handed round for inspection a draft of the proposed new form of Certificate to be printed upon good paper with a counterfoil to form the Society's record of the issue of the Certificate. The Certificates would be serially numbered and it was thought that the Secretary might be able to trace, at least approximately, the number of Certificates hitherto issued and to start from that number. The draft, with slight amendment, was thought to be suitable, but it was left to the President and Secretary to decide finally.

Silver Medal.—As, upon consideration, the expenditure, which would be involved in obtaining a special die for the proposed Silver Medal was found to be too heavy for the Society's funds, the President handed round a silver medal of stock pattern bearing the word "Horticulture" and a design upon which the Society's name, etc., could be engraved. This suggestion commended itself to the members generally but Mr. Blow said he had some hope of obtaining a present of a special die. In these circumstances it was left to the President and Hon. Secretary, in consultation with Mr. Blow, to decide what form of medal should be adopted.

The place of meeting for next year was then discussed. The President expressed his pleasure that there was so good an attendance of Northern members and, as there might be as good an attendance, or even a better one, next year if a locality to suit Northern members were again chosen, it was provisionally decided to hold the meeting in the Lake District.

Fronds or plants were then exhibited by Mr. Askew, Mr. Cowan, Mr. Lovelady, Mr. Sheldon, and Mr. Whiteside. Certificates were awarded as follows :—

(i) to Mr. Sheldon for *Athyrium f.f. percristatum*, Sheldon : frond exhibited by himself.

(ii) to Mr. Whiteside for *Lastrea pseudo-mas polydactyla*, Whiteside ; wild find at Hornby thirty or forty years ago : frond exhibited by himself.

Mr. Sheldon's fern was a very beautiful and perfect thing. Although it is well known that *cristatums* and *percristatums* can be raised from the original *setigerum* of Garnett, and many pretty forms have been raised before, this one was thought to surpass, in neatness and thoroughness, anything previously seen in this line.

The members remained in the neighbourhood for several days after the Meeting and various fern-hunting excursions were made. Several uncommon species were seen such as *Polystichum lonchitis*, *Lastrea rigida*, *Asplenium viride* and *Polypodium Robertianum*, but no variety was found except a multifid form of *Asplenium viride* by Mr. Sheldon. *Scolopendrium vulgare* was found in fair quantity in the clefts of the limestone pavements of Ingleborough and several minor variations were noticed, but none worthy of record. The locality recorded by Lowe for *Lastrea uliginosa*—viz., Browsholme Park, near Clitheroe, to which the members were kindly invited by Colonel Parker, the owner—was searched but it was no surprise that that elusive fern was not discovered.

The members were also entertained and made welcome by Mr. and Mrs. Sidney Farrar, of Ingleborough, and their wonderful Alpine garden was inspected and admired.

Very satisfactory quarters and the greatest consideration were met with at the Ingleborough Hotel during the party's stay in the district, and this typical Yorkshire hospitality contributed in no small degree to the comfort of the members.

THE HARDY FERNS AT SOUTHPORT.

By A. J. MACSELF (Editor, *Amateur Gardening*).

For the second time we have reason to be well pleased with the manner in which the classes for hardy British Ferns were supported at Southport Show (August 28-30).

True, there were but three exhibits in the class for a group occupying 100 square feet, as against seven entries last year, but it must be remembered that the season had been an extremely trying one for ferns. Most collections suffered first from the exceptionally severe late frost, and then from the prolonged drought and parching winds which prevailed in most districts and almost without a break right up to the time of the Show. Two owners of good collections who had promised the writer to exhibit in this class were obliged by the unhappy condition of many of their plants to abandon the idea.

Let us hope next season will be favourable to growth and that several new exhibitors will stage groups to add to the importance of our own particular feature of this wonderful exhibition of British horticulture.

That the Show Committee were well pleased with the results of the first year's experiment is evidenced by the fact that they readily acquiesced when it was suggested that additional small classes should be provided for plants in pots, and it is pleasant to record that these brought sufficient entries to fill a long stretch of staging, and among the plants shown were some very fine varieties.

It may at once be said that whilst we were pleased with both the number and quality of the exhibits in these smaller classes we are convinced that many more of the members of this Society could well stage in some of them. There can be no doubt the cult of Hardy British Ferns will make greater and more rapid progress when the public are enabled to make acquaintance with the choicer and most beautiful varieties by seeing them at flower shows.

Membership of the British Pteridological Society expresses a desire and determination to foster and aid the development and advancement of the study and cultivation of Hardy British Ferns. We have now an excellent opportunity to support Southport Flower Show in its willing endeavours in this direction, and by well filling the Fern classes there, may not only show the appreciation due, but also induce the organisers of other important shows to introduce similar classes. One result of the Southport enterprise has already been to bring new members to our Society. Let all endeavour to keep interest growing. We may make our own section one of the most popular and important features of the whole show, so that the majority of visitors will go home talking of British Ferns.

To return to the Trophy class, our President once again secured the coveted award with a superb group, rich in variety and full of cultural excellence. The strong point about Mr. Cranfield's group was the magnificent development of the larger growing kinds ; *Polystichums* with fronds longer than one's arm, crested *Lastreas* bold and upstanding, *Scolopendriums* with foliage both broad and long, yet precise in their frilled margins and crested ends made the group spectacular at first glance and pleasing to all. Nevertheless, a closer and more critical examination revealed the fact that the congested, fastigiate and dense forms of smaller and extremely choice things were well represented, and every plant was a picture of health bespeaking careful and clever culture. A grand plant of the unique *Athyrium f.f. Clarissima* again occupied a conspicuous position in the centre of the group, compelling unstinted admiration. Other notable plants were *Athyrum f.f. cristatum*, Druery (Kilrush), *A. f.f. Victoriae, Lastrea ps.-mas polydactyla*, Wills, *Polystichum aculeatum densum, Polystichum aculeatum plumosum*, Green, *P. acul. pulcherrimum*, Bevis, *P. acul. pulcherrimum*, Druery, *P. acul. gracillimum*, Druery, *P. acul. gracillimum*, Cranfield, *P. angulare divisilobum*, Bland, *P.a. flabellipinnulum, P.a. divisilobum plumosum laxum, Scol. vulgare crispum speciosum*, Moly, *S.v. crispum grande*, Wills.

There was, admittedly, a long stride between the all-round excellence of the Cup-winning group and that staged by Mr. Joseph Lloyd, of Southport, who was awarded second prize, but that is not to say his group was lacking in merit. It contained, in fact, a number of really good examples of first class ferns, a beautifully developed specimen of *Asplenium trichomanes incisum* being one of the best pieces in the group, while among other choice things were *Scol. v. crispum*, Mrs. Stabler, *Polystichum angulare divisilobum plumosum laxum, Athyrium f.f. setigerum percristatum, A. f.f. gemmatum*, Barnes, and *Lastrea dilatata crispata ochracea*. In general arrangement Mr. Lloyd proved himself a capable exhibitor, his group containing enough, but not too many plants, all of which were so placed as to display every charm to the full.

Messrs. Geo. Oliver & Sons, Melrose, Scotland, deserve high praise for again bringing so great a distance a superb collection of good ferns with which they closely followed Mr. Lloyd. The weakness in this case, as last year, was an insufficiency of large specimens to cover space. We know a nice plant of a miniature fern is as meritorious as a big strong grower, but in an exhibit at a flower show bare space and sparsely furnished foreground must inevitably prove a sore handicap against groups which require no additions to complete a well-balanced and pleasing display. Messrs. Oliver's *Athyrium f.f. uncoglomeratum* was a covetable specimen worthy of many points for quality and skilful cultivation. They had also some choice *Polypodiums* and *Aspleniums*.

The pot plant classes were well filled and embraced some delightful ferns, exhibitors including the Rev. Canon Moore from Ireland, Mr. F. W. Askew from Keswick, Miss E. A. Lloyd, Mr. John Lovelady and Messrs. G. Gibson & Co.. as well as Mr. Cranfield and Mr. Joseph Lloyd.

BRITISH FERNS IN LONDON TOWN.

24th September, 1929.

One went from busy Oxford Street into Southampton Row, and to the London Day Training College (L.C.C.). Therein was a huge exhibition of all kinds of activities bearing in the main on Nature Study in our schools. It was the " Annual " of the School Nature Study Union. Sir John Russell and Lady Russell opened the proceedings, and, afterwards, going around the tables of exhibits, seemed very much interested in the fine display of fronds sent by Mr. Cranfield.

That they were not alone in this was evident during the afternoon. As " demonstrator " of the exhibit, on behalf of our President, I found real *wonderment*, not only at the *kinds* of ferns, but at the fine condition of the fronds, after this long period of drought.

As usual, the two main causes of " exclamation notes " were the *crispum* Hart's-tongues, and *plumoso-divisilobe* Shield Ferns. Their beauty was evident and much commented on. However, *A. f.f. Victoriae* and *Clarissima*, also *kalon superbum* were much noticed, besides the *Poly-*

podiums, Blechnums and *Lastreas.* This enabled me to call attention to the scientific side of our cult. We may consider it a decidedly useful afternoon.

FRANCIS W. THORRINGTON.

HELP FOR ISOLATED STUDENTS.

Very few people become pteridologists without some slight tendency towards use of "the midnight oil." Amongst our membership there must be many who are at least willing to acquire a little knowledge of the natural laws governing plant life : or even of the somewhat special requirements of the multitude of Ferns. The latter—at least as far as British Ferns are concerned—have, in the past, been very well served by the articles in this *Gazette.*

For the more general body—those who desire to study the trend of modern botanical research ; or for the more "specialist" group amongst them, who wish to know what scientists are finding out as to the intimate structure, physiology, or the evolution of the Ferns generally—these pages are perhaps hardly the place. The knowledge the first group requires is too general ; that needed by the latter too technical.

What, then, is the Fern-lover to do, when he, or she, becomes anxious to know more of the ferns, etc., than is strictly necessary for their cultivation and enjoyment ? If living near a large town, or if wealthy enough to purchase the books required, the task is relatively easy. This article, written by an Hon. Librarian of a village Library (under the County Library System) is an attempt to explain the methods by which, although "buried in the country," those whose purses are *not* long may yet participate in the joy of borrowing and studying the many specialist books now available. The County Libraries, with their village branches, served by voluntary helpers, are well known to most people. Not quite so familiar, though, are the facilities developed during the last few years in connection with the Central Library for students. This organization, mainly financed by the Carnegie Trustees, but of late, to some extent, by grants from various County Council Education Committees, is gradually freeing even the most isolated villages from the reproach of "book-hunger."

We will suppose the country student desires a particular technical work. He mentions this to the local librarian, who then gives him an application form and, if satisfied, certifies thereon that the applicant, a member of his Library, is a responsible person and to be entrusted with such books. This form is sent to the County Librarian, who may have the book in stock at County headquarters, and will then post it to the borrower, usually for one month. If, however, it is not in the County Library, the application is then sent on to the Central Library at Galen Place, Bury Street, near the British Museum, London.

The Central Library supplies books (except fiction) published from 6s. to two guineas, and unobtainable by County headquarters. Usually, the County Education Authority undertakes the payment of the outward postage and all the borrower incurs is the return postage. If the book is not desired by some other applicant, there is generally no difficulty in having it renewed for a second month, or even for a third, so the student has a chance of a highly fruitful browse in his favourite pastures.

At first sight, that the Central Library should undertake such a large commitment seems too good to be true, and this would, no doubt, be the case if dependent solely on their own resources. After all, their space is limited, and their income a restricted one, (for example, the Government grant expected has not materialized) so one can hardly expect miracles.

Nevertheless the result seems miraculous, for the Central sends out tentacles and so gets in touch with some forty libraries which have undertaken to co-operate in the great enterprise. Naturally their Librarians retain the right to veto the issue of any book unsuitable for lending, but, in practice, there is now access to *most* " serious " works.

Moreover, arrangements can be made to lend a number of books (for as much as six months) to a group of students. One only faintly realises what this may mean when the countryside awakens to the opportunity.

In conclusion, should one of our members be out of touch with even a village library branch, why not *start* such a centre under the system. It is really simple, and I would very readily give further information desired to anyone sending a stamped addressed envelope.

FRANCIS W. THORRINGTON.

CYSTOPTERIS ALPINA, DESVAUX.

This is considered to be the *Polypodium regium* of Linneus, *Cystopteris regia* of Presl and Fee, *Cystea regia* of Smith, and is a fern about which there seems to be much confusion in the minds of both botanists and cultivators. For, while some botanists consider it to be a form or sub-species of *C. fragilis,* others stoutly maintain it as a distinct species. Also the figures and descriptions which have been published are exceedingly various. For instance, the picture of it, given by E. J. Lowe, in " Our Native Ferns," and reproduced in Druery's " British Ferns and their Varieties," is a small *Woodsia*-like plant having bipinnate fronds and blunt rounded segments, and looks rather like a dwarf form of *C. fragilis dentata.* Under *Cystea regia* Newman figures a somewhat similar plant as " a sketch of a frond gathered from the wall at Low Leyton, Essex," which was the first recorded British station and the one upon which its reputation as a British plant mainly rests. This figure shows the pinnules more acutely incised than in Lowe's plate, but the fronds are still bipinnate, not tripinnate. Moore's Nature-printed British

Ferns (folio edition), however, shows fronds which are fully tripinnate, although the ultimate divisions are blunt. Britten's "European Ferns" shows a fern still more exquisitely divided and with linear but *notched* ultimate segments. Hooker, in the "Students' Flora," describes "sub-species alpina" as "frond quadripinnatifid, pinnules incised nearly to the rachis, ultimate divisions not quite contiguous." Dr. Druce, in his edition of "Hayward's Botanists' Pocket Book," gives *alpina* as a sub-species of *fragilis,* and describes it as having "fronds quadripinnatifid, segments cut nearly to the mid-rib." Newman, in his "British Ferns," says "the fourth and last *variety* noticed by (Sir J. E.) Smith, and one which Professor Don considers distinct as a species, is called *Cystea regia* by Smith, who supposes it to be the *Polypodium regium* of Linneus. I have carefully examined the specimens preserved in the Linnean herbarium; these are three in number: the first appears to be the normal form of *C. fragilis,* although the specimen is injured; the second is the plant known to cultivators as *Asplenium fontanum*; and the third is the *Polypodium dentatum* of Dickson." It would appear therefore that Linné himself was not very clear about the identity of this fern. Following in Newman's footsteps I have myself examined the Linnean specimens and I agree with him except that I should call the first specimen a form of *fragilis* a little more finely divided than the normal. (There are plenty of these in Switzerland and some in England.) It does not seem to have any of the distinctive characters of true *alpina.*

In the latest edition of Babington's "Manual of British Botany" *alpina* is placed, "with much doubt," as a sub-species of *fragilis* and is described as: frond bipinnate; pinnae ovate, deeply pinnatifid with broadly and shortly linear segments, partly cloven, *veins reaching the blunt end.* Modern botanists now lay great stress upon the veins terminating *in the notches,* and not in the apices of the ultimate segments, and this seems to be the chief, if not the only, character which is common to the forms which are variously described as *C. alpina.* M. Kestner, who has kindly sent me fronds and plants from various stations in Switzerland, comments upon this character as the only distinguishing one which can be relied upon. He also states that *alpina* is not found lower than 2,000 metres in that country, and that it affects limestone and is rarely found upon non-calcareous formations. Through the courtesy of various correspondents I have had at least half a dozen different plants sent as *C. alpina.* Some of them I am unable to distinguish from *fragilis* and the rest are exceedingly variable in form while mostly agreeing in the termination of the venules in notches. My grandfather grew a plant sixty years ago which he called "the true *alpina*" and which came, he said, from the Dolomite Mountains. This plant was distinguishable at a glance from all forms of *fragilis,* being finely divided like Moore's figure, but having also blunt linear lobes with notched apices. The character which impressed itself upon me at the time was the conspicuousness of the veins which, however, were depressed rather than prominent. Until recently I had lost sight of this type for thirty years, but, through the courtesy of two members of the Society (Dr. Rowlands and Mr. Sherrin) I have again obtained it and have raised a large batch of seedlings which are quite true to type and the plants are distinguishable from *fragilis* and from other so-called *alpinas* in a very early stage of growth.

On a consideration of all the available specimens I should myself describe *alpina* (aggregate) as generally dwarfer than *fragilis* ; fronds, pinnae and pinnules all noticeably rounder than that species ; ultimate segments more or less deeply notched ; *veinlets terminating in the notches.* I distinguish two main types of *alpina* : (i) forma *obtusa,* which is bipinnate with pinnules only slightly notched, and (ii) forma *dissecta,* which is tripinnate or quadripinnatifid with the ultimate segments *deeply* notched, the notch being slightly open.

Also in this form the canaliculate veins are very noticeable. The two forms are doubtless connected by intermediates. They both sow themselves in my fernery and the seedlings are distinguishable, even in the primary fronds, not only from *fragilis* but from each other. Both are worth growing, but *dissecta* is, in my opinion, much the more beautiful and distinct of the two. In conclusion, I regard the aggregate *alpina* as a distinct species (which is variable like most other species) but, in the absence of any precise definition of what constitutes a species, this must always be a matter of opinion (cf. *Gazette,* Vol. III, pp. 159 and 178 *et sequitur*).

F.W.S.

CYSTOPTERIS FRAGILIS BERNH, VAR. DICKIEANA (SIM).

This little fern, with its obtuse pinnules, its deflexed and imbricated pinnae, its deep green colour, is too well known to fern-lovers to require any extensive description. The object of this note is rather that of correcting the statement, which is made in almost every book on Ferns, that Dr. Dickie was the original discoverer of it. The following extract, which may well serve as the final word on the subject, is taken from Dr. G. Dickie's book, "The Botanist's Guide to the Counties of Aberdeen, Banff and Kincardine," published in 1860, and his own words are quoted :—

"*Cystopteris fragilis, Bernh. var.* γ., *Dickieana.*—Having been the first to distribute specimens in a living state, among cultivators, my name has been associated with this singular variety. It was, however, no original discovery of mine, the late Professor Knight having been in the habit of showing it to his pupils. It is now completely extirpated from the little cave South from the harbour at the Cove. I have found what appears to be the same variety in the crevices of a moist wall on the North side of the road about two miles West from Dunkeld. About half a mile North from the Cove, there is a dripping cave where there is a variety near the last. I have known it there during the last fifteen years."

There is some variation in the literature of the subject as to the number of localities in which Dickie's Fern has been found. There appears to be some doubt as to whether it has been found elsewhere besides the neighbourhood of Aberdeen, where all the plants may easily have originated by wind-borne spores from one primary sport. This might be considered good evidence against its being given specific rank. In any case, it is of interest as being one of the very few among the great number of fern variations which have found their way into the botanical text-books and which have earned the serious notice of systematic botanists. A further point which might be noted is that *Cystopteris Dickieana*, " the least divided form," has by at least one botanist been included as a sub-species or variety of *Cystopteris alpina*. The two plants are so distinct that the reason for such a close association is not easy to understand.

S. P. ROWLANDS.

[We do not know upon what grounds Milde refers to Dickieana as a variety of *alpina* unless it be that it has some resemblance, in its blunt and rounded segments, to the *obtusa* form of *alpina*. There does not seem to be any evidence that it has been found anywhere in association with *alpina*, nor indeed that it has been found on the continent at all, and the resemblance above mentioned seems to us to be merely superficial and accidental. *Dickieana* shows no sign of the notched segments of *alpina* and the venules terminate in the rounded edges of the pinnules as in *dentata*. Lowe describes, and figures, a variety of *fragilis* (*decurrens*, Moore) as found near Wemyss Castle in Fifeshire. The figure shows this fern to be intermediate between *Dickieana* and *dentata*, though nearer to the former than to the latter. Lowe also records for *Dickieana* the locality near Dunkeld (Perthshire) which is mentioned by Dr. Dickie, and also another habitat in the Isle of Arran off the coast of Ireland, where it was found by the late Dr. David Moore, of Glasnevin. Dr. Druce has found *Dickieana* in several places in Aberdeenshire and Kincardineshire, and, on account of its comparatively wide distribution and constancy from spores, is half inclined to regard it as a separate species. The variety *decurrens*, we think, is a significant connecting link with *dentata*, of which we regard *Dickieana* as an extreme and congested form. We have examined the spores of *alpina*, *fragilis*, *dentata* and *Dickieana*, and find that while those of *alpina* are distinctly echinate (like little hedgehogs) those of *fragilis* are less markedly so and some of them only covered with papilliform projections ; those of *dentata* are mostly papillate and those of *Dickieana* almost entirely smooth. We do not consider these differences sufficient to constitute specific characters, but certainly, so far as spores are concerned, *Dickieana* is more distinctly marked off from the rest than any of the others. It is also the furthest from *alpina* and nearest to *dentata*.—*Ed.*]

THE FERNS (*Filicales*), *by Professor F. O. Bower, F.R.S., etc* (*Continuation of Review.*)

Vol. III.—*The Leptosporangiate Ferns.*

The Ferns dealt with in this concluding volume are, typically, the " modern " ones, i.e. those which have been called, usually, the *Polypodiaceae*. The attempt to arrive at a phyletic grouping of these multitudes must necessarily be an immense task compared with the relatively small number of the survivors of the older—Eusporangiate—Ferns.

It becomes evident that the *Polypodiaceae* are not to be classified as having one line of descent. As was mentioned in Vol. II, the result, up to the present, shows six main phyla of the Leptosporangiates, arising, far back in time, from three of the great ancient groups (*vide* diagram, p. 288, Vol. V, No. 12 of *Fern Gazette*).

Chapter XXXVI deals mainly with *Hypolepis* and *Dennstaedtia*, as beginners of the change from Dicksonioid ferns to the typically Davallioid groups that are described in Chapter XXXVII, such as *Davallia*, *Lindsaya* and *Nephrolepis*.

The other side of the Dicksonioids then comes in—Chapter XXXVIII with the Pteroids. Of these, our Bracken (*Pteridium aquilinum*) is probably the best known example ; the only one of its genus, now separated from the 157 species of *Pteris* because of its two " indusial lips " which prove a near relationship to *Lindsaya*. Here also come *Paesia*, *Lonchitis*, *Acrostichum* and *Histiopteris*.

With Chapter XXXIX commence the Gymnogrammoid ferns, held now to be descendants, through *Plagiogyria*, of *Osmunda*-like primitive types. The number of genera of the Gymnogrammoids is large ; many of the names decidedly unfamiliar to all but specialists, but we note such familiar friends as *Cryptogramme*, *Onychium*, *Adiantum*, *Gymnogramme*, *Pellæa*, and *Cheilanthes*. The reason in tracing these from

Osmundaceae seems clear, yet how "different" to the inexpert eye seems *Adiantum* from *Osmunda.* Nevertheless, when I contemplate many *Osmunda* sporelings I can almost see the primal *Adiantum* frondlet, though this, of course, may not be *real* evidence, but only resemblance

We now come—Chapters XL to XLIV—to the great groups that have arisen, apparently, from the *Cyatheaceae,* forming the two great phyla of Blechnoids and Dryopteroids. In Chapter XL we commence with such as *Woodsia* and *Cystopteris* ; Chapter XLI continues with the terrific *Dryopteris* of the 741 species ; (we can only gasp "Good Lord, deliver us!") the 138 species *Aspidium* ; the 112 species *Polystichum,* and a number of lesser genera such as *Polybotrya.* Of course, as the "central" figure of this great *Dryopteris* genus we have our Common "Male Fern." Other old friends are the Oak Fern and our Shield Ferns ; but I am still quite unrepentant as to the unwieldy nature of those 741 species in *Dryopteris.*

Chapter XLII contains the *Asplenieae,* with the 429 species of *Asplenium,* 208 species of *Diplazium,* 86 species of *Athyrium,* and some other genera such as *Ceterach* with its 4 species.

Chapter XLIII brings in *Onoclea* and its relations, such as the Ostrich Feather Fern (*Matteuecia struthiopteris* (*L*) *Todaro*); and then Chapter XLIV concludes with the family of the Blechnoids. These, of course, mainly range around the 138 species of the genus *Blechnum* ; lesser genera being *Stenochlaena, Woodwardia, Doodia,* and last, but not least, the small genus *Phyllitis* containing our Hart's-tongue (*P. Scolopendrium*).

Those two strange genera, *Dipteris* and *Natonia,* in Chapter XLV., introduce us to the Dipteroid ferns. We find, instead of two isolated genera, as formerly understood (or should we rather say *mis*understood?) that here the Dipteroids are held also to include such types as *Platycerium, Hymenolepis,* *Pleopeltis*, etc. The "etc.," it may be stated, is advisable, for as a concluding "hint" we are told that even "*Phlebodium* may be held as a Dipteroid derivative." That is coming remarkably close to our Common Polypody (see p. 280 of *British Fern Gazette,* Vol. V, No. 12), and who, a few years ago, apart from "pteridological prophets," would have related *that* to the strange Malaysian *Natonia* on the one hand, or to *Platycerium* on the other ?

Nearly related to the Dipteroids—as probably coming via *Metaxya*—in Chapter XLVI the Metaxyoid ferns are considered, with the genera *Elaphoglossum* of 280 species and *Syngramme* of 16 species.

Chapter XLVII discusses the Vittarioid ferns, mainly grouped around the 46 species of the genus *Vittaria*. These strange "epiphytic Ferns with narrow grass-like leaves" have always been rather puzzling to systematists, who have variously placed them as Acrostichoid, or Gymnogrammoid, etc. Here they are considered as a group of 5 genera, of which *Hecistopteris* is a probable ancestral type shewing Gymnogrammoid characters, but evidencing the transition to this small "natural group of genera."

Chapter XLVIII deals with "Genera incertae sedis" ; groups which evidently require much more study before their true affinities are decided. It seems strange *to me* to find *Cystopteris* "in this galley." However, its position seems uncertain, though perhaps "Cyatheoid" rather than "Davallioid." A number of small genera, equally doubtful, are described ; and then the *Salviniaceae,* with genera *Salvinia* and *Azolla,* which are said to be "difficult to attach definitely to any family of living Ferns."

Chapter XLIX attempts a "Summary of results," and Chapter L discusses the "Evolutionary bearings of the results." Both chapters are, necessarily, somewhat technical, but the main idea one gets is that, in the Ferns—perhaps due to more intensive study—we have attained to a phyletic understanding somewhat ahead of our ideas of other families of plants. That is not to imply, of course, that even in *Filicales* we have reached near to finality. On the contrary, so many new paths for investigation are opened that Prof. Bower again quotes Stevenson's motto, " To travel hopefully is a better thing than to arrive." He leaves us, for the future, many " worlds to conquer." The great thing is that this remarkably interesting " 3-volume novel " has brought so much " sense " into the tangle of Fern relationships. I, for one, have gained a perspective far greater than I ever hoped for prior to my hurried browse in this new Bowerian pasture.

One conclusion of this investigation into the " Evolutionary bearings of the results " is decidedly of great import to the members of the British Pteridological Society. Professor Bower analyses the evidence for the " inheritance of acquired characters." From the known facts of Fern life, past and present, he, to put it briefly, ranges himself with Sir Francis Darwin's Presidential Address to the British Association in 1908, and advocates consideration of the Mnemic theory of Semon. It appears necessary to conclude " that ontogenetic adjustments—so-called fluctuating variations—continued without any time limit, may become hereditary." Semon's Mnemic Theory postulates that the effect of constantly repeated stimuli—each such influence impressing a record or " engram " on the nuclei of the part affected, tends to spread to all parts of the organism. Eventually, even the germ-cells can become passers-on of the persistent " engram." It " gives one furiously to think " when we remember the practice of many of us has been to " sow only from spores of the most characteristic part of a frond." Has the Editor of our *Fern Gazette* a series of " later views " to give us, on the lines of his survey of Weismann's Theory (B.P.S., August, 1896) ?

Finally, this brief " description," for I fear it is miscalled a " review," especially of Vol. III, is all too inadequate to convey any idea of the mass of detail involved. A very long period of study would be necessary before any of us could become " competent critics " of such a Fern Encyclopaedia as this.

FRANCIS W. THORRINGTON.

NOTE.—I must cry " Peccavi " for the number of terrible fern names I have been induced to quote. Yet, I have " sinned " deliberately, for to familiarize fern students with the nomenclature of the exotic relatives (or the fossil ancestors) of our British Ferns, is, I must contend, a good work.—F.W.T.

DISTINCTIVE PROTHALLIA.

There is a good deal of sameness about the prothallia of various ferns and the superficial observer might imagine that they were all alike, but this is by no means the case. They are mostly small green circular or heart-shaped translucent scales having root-hairs upon their lower surface, but those of *Osmunda* and *Todea,* for instance, have the quality of translucency in a greater degree than most others (the spores, even, of these two genera are distinct, being of a green colour instead of the usual brown tint). Those of *Dryopteris* (*Lastrea*) *montana* are of a pale yellowish green colour and are strap-shaped rather than circular in form ; those of *Polypodium vulgare* also tend to be strap-shaped, but are of a darker green than those of *montana*. Those of *Woodsia alpina* are downy upon the upper surface and can be recognized easily by this peculiarity, while those of *Anagramma* (*Gymnogramma*) *leptophylla* are lacerated like Endive and are equally recognizable though entirely different from those of *Woodsia.* It is probable that many other peculiarities of these incipient ferns may be noticed by those who pay special attention to them while raising ferns from spores.

F.W.S.

OBITUARY : PEARSON.

PEARSON : On November 14th (accidentally killed on railway), Charles Edward Pearson, V.M.H., F.L.S., M.B.O.U., Hillcrest, Lowdham, Nottingham. Mr. Pearson's firm were the originators of a distinct strain of *plumose divisilobes* in *P. angulare.* Our member's death is a heavy loss to horticulture generally as well as to the Society.

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Bower, Professor F. O., M.A., D.Sc., F.R.S., etc., 2, The Crescent, Ripon, Yorks.
Curtis, C. H., F.L.S., "The Gardeners' Chronicle," 5, Tavistock Street, London, W.C.2.
Druce, G. C., M.A., D.Sc., F.R.S., Yardley Lodge, 9, Crick Road, Oxford.
Hay, T., V.M.H., Superintendent, Hyde Park, London, W.2.
Moore, Sir Frederick W., Kt., M.A., V.M.H., F.L.S., Willbrook House, Rathfarnham, Co. Dublin.
Preston, F. G., Curator, Botanic Gardens, Cambridge.
Wiper, Joseph, 431, Young Street, Vancouver, British Columbia.
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Andersson-Kottö, Miss Irma, John Innes' Institute, Mostyn Road, Merton Park, London, S.W.19.
Bickham, Spencer H., J.P., F.L.S., Underdown, Ledbury, Herefordshire.
Bigland, J. W. S., 20, Parkfield Road, Bebington, near Birkenhead.
Blow, Thomas Bates, F.L.S., The Chalet, Welwyn, Herts.
Bowles, E. A., M.A., V.M.H., F.L.S., Myddleton House, Waltham Cross, Herts.
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Bowman, J. H., Greenham Common, Newbury, Berks.
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Bolton, Thomas Henry, F.R.H.S., Birdbrook, Halstead, Essex.
Bouskell, Frank, Sedgemere, Market Bosworth, Leicestershire.
Butler, Frank, 2, Lorne Street, Reading, Berks.
Cordrey, C., 151, Bedfont Lane, Feltham, Middlesex.
Cowan, Alexander, Valleyfield House, Penicuik, Midlothian.
Cranfield, W. B., F.R.H.S., F.L.S., East Lodge, Enfield Chase, Mdx.
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Carter & Co., Raynes Park, Wimbledon (S.W.), Surrey.
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Dempster, R., Carresden, Dumfries, Scotland.
Donald, W., Ashburn Lodge, Milliken Park, by Johnstone, Renfrewshire, Scotland.
Dawkins, Alfred, 16, Fordhook Avenue, Ealing Common, London, W.
Darlington, H. R., M.A., LL.M., F.L.S., Park House, Potters Bar, Middlesex.
Doody, Denis J., The Gardens, Muckross Abbey, Killarney, Ireland.
Elton, C., 3, Stirling Road, Enfield, Middlesex.
Elliot, Rev. E. A., M.A., The Vicarage, Longstone, Bakewell, Derbyshire.
Fenwick, Mark, J.P., Abbotswood, Stow-on-the-Wold, Glos.

Fletcher, B., J.P., The Yews, East Hagbourne, Didcot, Berks.
Felton, R. F., 7, Hanover Court, Hanover Street, London, W.1.
Gordon, W., Lauriston, Victoria Road, Maxwelltown, Dumfries.
Greenfield, Percy, Stuart Road, Warlingham, Whyteleafe, Surrey.
Gill, Major Wm. P., 13, Crescent Parade, Ripon, Yorks.
Grant, John, 7, Market Street, Turriff, Aberdeenshire.
Gill, G. P., Head Master, Bentham Grammar School, Bentham, Yorks.
Hawkins, Rev. Canon E. H., M.A., Trinity Lodge, Bisley, Stroud, Glos.
Henwood, T. E., 16, Hamilton Road, Reading.
Harvard University (Gray Herbarium), Cambridge, Mass., U.S.A.
Hanbury, Frederick J., F.L.S., Brockhurst, East Grinstead, Sussex.
Holmes, Mrs. Carl, The Node, Welwyn, Herts.
Hughes, J. E., Lee Hall, Mollington, near Chester.
Kentucky University (Department of Botany), Lexington, Mass., U.S.A.
Kestner, Paul, F.L.S., "Le Clos Etoilé," Chailly Village, s/Lausanne, Switzerland.
Kaye, Reginald, Coombehurst, Coombe Hill Road, East Grinstead, Sussex.
Laurie, G. F., Laurel Villa, Kenmure Avenue, Bishopbriggs, Scotland.
Lawson, G. C., Mayfield House, near Ashbourne, Derbyshire.
Laxton, Edward, 73, Bushmead Avenue, Bedford.
Lawrence, Sir William, Bart., Burford Lodge, near Dorking, Surrey.
Loder, Gerald W. E., M.A., F.L.S., Wakehurst Place, Ardingly, Sussex.
Leak, G. W., 1, Clarkson Avenue, Wisbech, Cambs.
Lloyd, Joseph, 4, Richmond Road, Birkdale, Southport.
Le Riche, F. P., Halberton, Hastings Road, Jersey, C.I.
Lovelady, John, 129, Manchester Road, Haslingden, Lancs.
Marsh, Miss S. A., Glenlyon, Holywood, Co. Down, Ireland.
Moore, Rev. Canon H. Kingsmill, D.D., Cedar Mount, Dundrum, Co. Dublin.
Morrison, W. T., Glensaugh, Bowerswell Road, Bridgend, Perth.
Meade, Joseph, Old Connaught, Bray, Co. Wicklow, Ireland.
Mount, Henry, 5, Summer Hill, Harbledown, Canterbury.
MacSelf, A. J., 114, Hamilton Road, Reading.
Monro, George, C.B.E., The Red House, Hendon Lane, Church End, Finchley, N.
Morsdell, —, East Lodge, Enfield Chase, Middlesex.
McLeod, J. F., Winton House, Ware, Herts.
Musgrave, C. T., F.R.H.S., V.M.H., Hascombe Place, Godalming, Surrey.
Maitland, John, J.P., Blythwood, Bycullah Park, Enfield, Middlesex.
Naylor, E., Corner Garth, Leadhall Lane, Leeds Road, Harrogate.
Nuttall, Mrs., Ingle Nook, Grindleton, near Clitheroe, Lancs.
Ormerod, G. F., Stratford Park, Stroud, Glos.
Orr, Allan, The Institute, Riccarton, Kilmarnock, Ayrshire.
Osborne, Arthur, 83, Abbey Street, Faversham, Kent.
Oliver, George, Tower Road, Darnick, Melrose, Roxburghshire.
Paine, Frampton, Chase Ridings, Enfield Chase, Middlesex.
Perry, A., The Nurseries, Enfield, Middlesex.
Pickard, A., 2, Snow Hill View, Wakefield, Yorks.
Praeger, R. Lloyd, D.Sc., 19, Fitzwilliam Street, Dublin.
Parkinson, J. J., The Lodge, East Lodge Gardens, Enfield Chase, Middlesex.
Pearson, C. E., Hill Crest, Lowdham, Notts.
Pam, Major Albert, Wormley Bury, Broxbourne, Herts.
Platten, E. W., High Street, Needham Market, Suffolk.
Rogerson, Miss B., Stanby Rokeby, Dunblane, Perthshire.

Rugg, H. G., Dartmouth College Library, Hanover, New Hampshire, U.S.A.
Russell, Archibald, 4, Crossgate, Cupar, Fife, Scotland.
Rowlands, Dr. S. P., 58, St. Mary's Road, Doncaster, Yorks.
Royal Botanic Gardens (J. W. Besant), Glasnevin, Dublin.
Russell, L. A., Richmond, Surrey.
Reeves, Hugh, Honingham Hall, Norfolk.
Robb, W. W., M.B., J.P., C.C., The Limes, Irthlingborough, Northants.
Ransom, Francis, F.C.S., Newlands, Hitchin, Herts.
Reuthe, G., F.R.H.S., Foxhill Nursery, Keston, Kent.
Scott, W. D. S., The Gardens, Government House, Buluwayo, S. Africa.
Scott, Mrs. W., The Gardens, Government House, Buluwayo, S. Africa.
Scott, F. W., Tullibole Castle, Fossway, Kinross-shire.
Scott, Mrs., Tullibole Castle, Fossway, Kinross-shire.
Sheldon, J. J., Monkhams, Lower Road, Great Bookham, Surrey.
Smithies, J. J., Boundary Bank, near Kendal, Westmorland.
Stansfield, F. W., M.D., F.L.S., 120, Oxford Road, Reading.
Stansfield, Tom, M.B., B.S., 120, Oxford Road, Reading.
Sherrin, W. R., A.L.S., South London Botanical Institute, 323, Norwood Road, London, S.E.24.
Stephens, G. E., 36, Bedford Road, Horsham, Sussex.
Sinclair, James A., 57, Stradella Road, Herne Hill, London, S.E.24.
Smithers, Major A., Morleys, Great Hallingbury, Essex.
Saorstat Eirann (Irish Free State), Stationery Office, Dublin.
Stephens, Michael, Coverwood, Ewhurst, Surrey.
Sutcliffe, Robert, 21, Market Street, Burnley, Lancs.
Thatcher, Mrs. E. J., The Manor House, Chew Magna, Somerset.
Thorp, W., Sorrentaile, Dalkey, Co. Dublin.
Thorrington, F. W., Sunnymead, Little Baddow, near Chelmsford.
Taylor, Mrs. James, Colomendy, Mold, N. Wales.
Trotter, P. D., Leith Vale, Ockley, Surrey.
Veitch, Peter, Royal Nurseries, Exeter.
Wardill, C. H., Field Villas, 4, Quay Road, Bridlington, Yorks.
Whiteside, R., 51, Borrowdale Road, Lancaster.
Williams, J. C. (Life Member), Caerhays Castle, St. Austell, Cornwall (Lord Lieutenant).
Wynch, Mrs. Violet A., F.R.H.S. (Life Member), Pine Hill, Camberley, Surrey.
Walker, W. B., Cook's Hollow, Enfield, Middlesex.
Willmott, Miss Ellen, V.M.H., F.L.S., Warley Place, Great Warley, Essex.
Warburg, Sir Oscar, O.B.E., Boidier Headley, near Epsom, Surrey.
Warren, James, Capel House, Waltham Cross, Herts.
Williams, P. D., Lanarth, St. Keverne, R.S.O., Cornwall.
Wallace, R. W., J.P., The Old Nurseries, Tunbridge Wells.
Wood & Son, F.R.H.S., The Nurseries, Taplow, Bucks.
Woodmansey, J. K., Knaresborough, Yorks.
Waterhouse, Alfred, East View, Warton, Carnforth, Lancs.
Westley, Edwin, 2865, Nina Street, Lamanda Park, Pasadena, California, U.S.A.
Young, John, Helston, 4, Pembroke Road, Sevenoaks, Kent.

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

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June, 1930.

EDITED BY

F. W. STANSFIELD, M.D., F.L.S.

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, "Monkhams," Lower Road, Great Bookham, Surrey.

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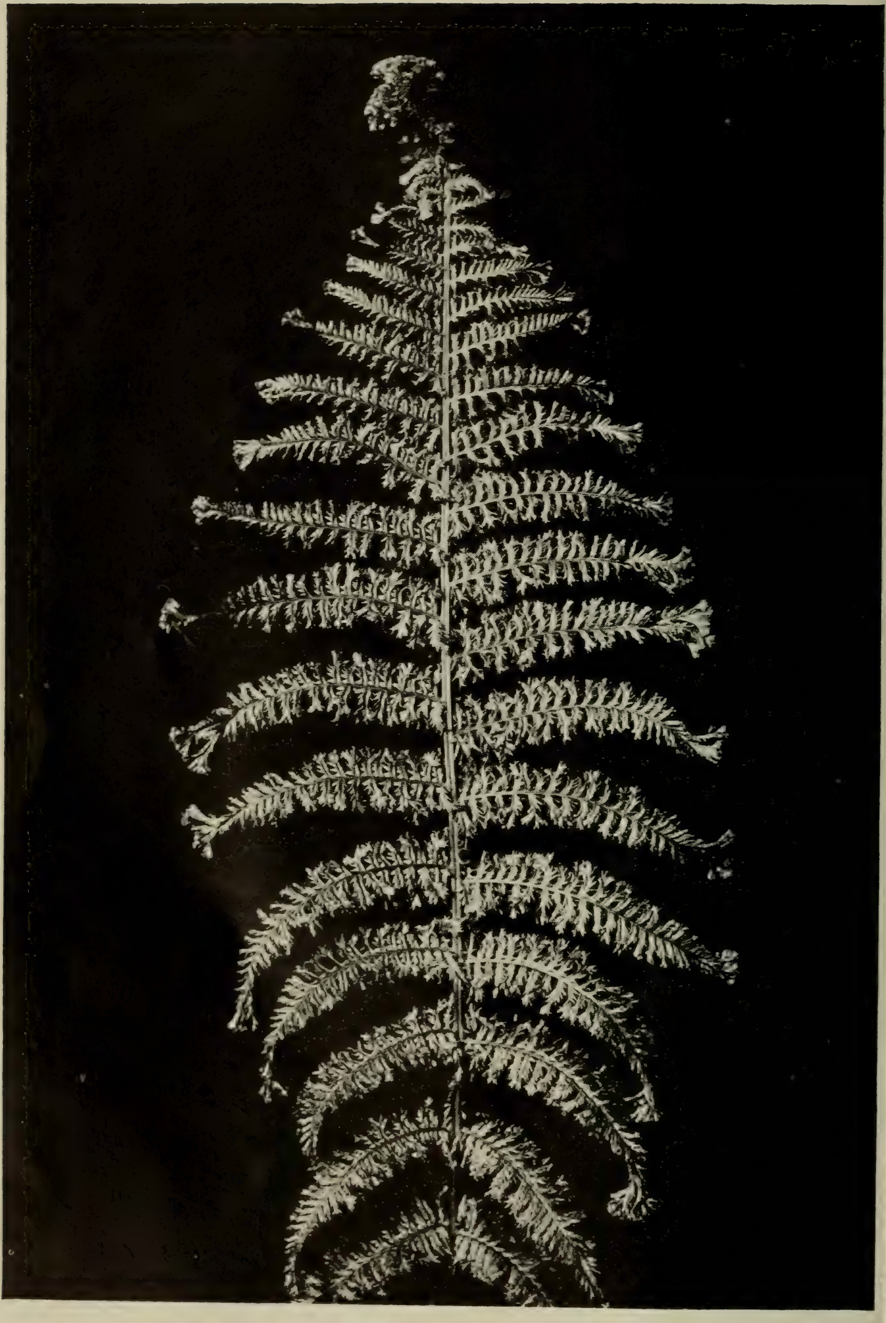

Athyrium f.f. setigerum percristatum, Sheldon.

THE

BRITISH FERN GAZETTE.

NEW SERIES.

VOL. VI. JUNE, 1930. No. 2

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EDITORIAL NOTES.

We have received from Miss Phillips, of Lemonfield, Holywood, Co. Down, daughter of our late Vice-President, Mr. W. H. Phillips, a present to the Society of her late father's lantern slides with which he was accustomed to illustrate his lectures on British Ferns. Dr. Praeger was an important intermediary in the choice of a home for these valuable slides. They illustrate many species and varieties of British ferns, including some of Mr. Phillips' own finds and showing the parentage of many of his cross-bred seedlings. They will no doubt be useful to those of our members whose enterprise takes the form of lectures and who may wish to borrow them for the purpose. Our hearty thanks go to Miss Phillips and to Dr. Praeger.

The present issue contains several contributions from various points of view on the subject of *Cystopteris alpina* or *regia*, a plant whose status as a British fern has been, and is still, in some doubt. Its place as a species (or variety) in the European Flora has also been the subject of some controversy. We trust the discussion will clear away at least some of the fog which has enveloped the subject of this interesting fern.

The Corporation of Southport has issued the schedule of prizes for the coming Exhibition at Southport on August 27th, 28th and 29th, which includes no fewer than twelve classes in which British Ferns can be shown, although there are several in which the word " British " is not specified and in which therefore American and other hardy species will be entitled to compete. There is also a class for three Exotic Ferns.

We have received a letter, enclosing a photograph of " Tree Fern Gully," from Mr. Charles Barrett, Hon. Editor of the *Victorian Naturalist* (Journal of the Field Naturalists' Club of Victoria), who will be glad to correspond with any member who is interested in ferns other than British. Mr. Barrett is also interested in orchids, of which Victoria is rich in terrestrial species. His address is Maralena, Maysbury Avenue, Elsternwick, S.4, Victoria, Australia.

Our Vice-President, Canon H. Kingsmill Moore, D.D., has been elected a Fellow of the Linnean Society of London.

Our Hon. Member, Dr. G. C. Druce, celebrated his eightieth birthday on May 23rd, when a reception, attended by many distinguished people, was given in his honour in London, Viscount Grey of Falloden, K.G., being the principal speaker.

We are glad to learn that our esteemed member, Mr. T. B. Blow, F.L.S., is safely back from Japan, whither he had been hastily summoned in the early winter on account of a bereavement in his family.

New members of the Society are : His Honour Judge Woodcock, K.C., Lyppiatt Park, Stroud, Glos. ; Mr. Ernest Wiper, 726½, Yates Street, British Columbia, the son of our late Hon. Member, Mr. Joseph Wiper, whose obituary notice will be found in the present issue ; and Mr. George Hawkings, Cressy House, Goldhawk Road, London, W.12.

The Hon. Treasurer, Mr. J. J. Sheldon, will be glad to receive remittances from any members whose subscriptions may be in arrear.

OUR FRONTISPIECE.

Athyrium f.f. setigerum percristatum, Sheldon.

A. f.f. setigerum, a wild find by Mr. Garnett, of Bowness, in 1878, is a pretty fern in itself, but is chiefly remarkable for the very beautiful seedlings which have been, and can be, raised from it. The original find was not crested, but finely divided and very bristly. A large proportion of its seedlings, however, when the variety is sown alone and grown as a pure culture, are crested and many are percristate. *Setigerum* is a fertile breeder and tends to communicate its character to other forms with which it is crossed. Many beautiful things have been raised from it, but unfortunately, in later life, these are apt to lose the crested character though retaining, to a variable extent, the *setigerum* type. Mr. Garnett, Colonel Jones and Mr. Wollaston raised percristate seedlings from it more than forty years ago as did the present writer soon afterwards. Messrs. Birkenhead, Mr. H. Stansfield and Messrs. May & Son crossed *setigerum* with *congestum*, *Victoriæ*, and other varieties, and many beautiful and curious things resulted. Unfortunately, both crosses and seedlings of pure descent afterwards deteriorated and most of them have been lost or thrown away as "rogues." In 1914, the late Mr. C. T. Druery gave to Mr. Woollard, of Acton, some seedlings believed to have come from his *superbum* strain of *plumosum*, and among these one was afterwards found which seemed to have been crossed with *setigerum* and in all probability was so though it may have been simply a stray *setigerum* seedling. This was thought to be a great acquisition and it was figured as a frontispiece in the *Gazette* for March, 1915, over the name of *A. f.f. percristatum setigero-superbum* Nothing was afterwards heard of it, however, and we presume it turned out a "rogue," or at best only a temporary "star."

Mr. Sheldon's plant is not only, as will be seen, a neater and more symmetrical fern, but it has retained its character unimpaired for at least three years in three different gardens. Of course, it may eventually prove a renegade, but we must give it credit for at least a good beginning. Mr. Joseph Lloyd showed a very nice seedling of similar character in his second prize group at Southport in 1929, and we are looking forward to seeing it again next August. The illustration is from a plant grown in the open air in the Editor's garden. It is in equally good character, but, as might be expected, is not so fully developed nor so foliose as Mr. Henwood's plant grown under glass. The latter was first selected for illustration but the photograph was judged less suitable for reproduction than the one shown.

THE SEPTEMBER MEETING.

The Annual Meeting of the Society will be held at the County Hotel, Kendal, Westmorland, at 10 a.m. on September 1st next. Kendal is considered to be the best centre for the Lake district fern hunting ground as motor omnibuses run to practically every part of the district, so that places which were formerly only reached by long walks or by specially chartered vehicles are now conveniently and cheaply accessible. From the fern-hunter's point of view this is not an unmixed benefit as it tends to the denudation of fern habitats by hawkers and other raiders of species. It does, however, lend itself to the exploration of such places as are still unspoiled of which, we hope, there are still many in the district. So far as is known the Lake district has not been systematically hunted for varieties for many years now, owing to the death or infirmity of most of the old hunters. The County Hotel (proprietor, Mr. J. C. Dougall) is near the railway station and affords comfortable accommodation for guests ; members are advised to make early application for bedrooms and to arrive at Kendal on the Friday or Saturday before the meeting if possible. No doubt alternative accommodation is available, but the County Hotel will be the headquarters of the party.

OBITUARY : WIPER.

We regret to announce the death, at the ripe age of 82, after only two days' illness, of our Hon. Member, Mr. Joseph Wiper, of Victoria, British Columbia, one of the founders of the Society. It was at his house that the original meeting was held, those present being Joseph Wiper, George Whitwell, John Wilson, John Gott, William Wilson and Robert Whiteside, the last-named acting as Hon. Secretary *pro tem.* Mr. Whiteside is now the only surviving member from that pioneer band, although Mr. Gott and Mr. W. Wilson are also still living, but no longer members of the Society. Mr. Wiper continued an enthusiastic collector and cultivator of ferns to the end of his life and a recent photograph shows him holding in his hands a plant of (apparently) *Osmunda regalis.* He was reputed to have the best collection of British and Canadian ferns in the Dominion of Canada, and his letters to the *Gazette* were always full of enthusiasm and energy. He was Treasurer to the Society during its early years before he migrated to Canada. He was the finder of a curious and beautiful dimorphic form of *Lastrea montana* (*filifera,* Wiper) and was present at the finding of several other good things, e.g. *L. montana corymbifera,* Garnett.

CYSTOPTERIS ALPINA, DESVAUX.

Dr. Stansfield, in the last issue of the *Gazette* put things on the right footing as regards this fern. *C. alpina* is *very strictly* alpine. It is, in fact, the most alpine of all European ferns, reaching higher than any other ; 2,700 metres is the record given by Jaccard (Catalogue de la flore Valaisaine, 1895) ; 2,800 metres has also been given by Schroder, August 6th, 1890, for a station at Cresta Avers in Switzerland on Dolomite formation for sub-var. *deltoidea,* Milde, which is a form also found on the Dolomite mountains in the Tyrol.

This fern is particularly abundant on or near the top of the mountains right and left of the Rhone near its entry into the Lake of Geneva and on the Savoyan mountains situated on the southern shore of the lake. There it is everywhere at altitudes between 1,800 and 2,400 metres, growing either on the rock, at foot of rocks or in loose stones and even in the alpine lawn. These mountains are all calcareous and I have never found the fern on non-calcareous formations. A very good illustration is given by Dr. Christian Luersen in "Die Farnpflanzen," Leipzig, 1889, p. 465. This volume is the third of Dr. L. Rabenhorst's "Kryptogamen Flora von Deutschland, Œsterreich und der Schweitz." Luersen gives the fern as a sub-species of *C. fragilis*; three forms of *alpina* are mentioned: (i) var. *regia*, Milde, which is said to be the connecting link with *fragilis*; (ii) var. *alpina* (the type); (iii) var. *deltoidea*, Milde, found in the Dolomite mountains in the Tyrol.

H. Christ, "Die Farnkräuter der Schweitz," Bern, 1900, admits *C. regia* as subspecies of *fragilis* with *alpina* and sub-var. *deltoidea* as forms of high altitudes.

Paul Ascherson & Grachner's "Synopsis der Mittel-Europaischen Flora," 2 Auflage, 1911-13, is the most recent synopsis of Central European ferns. He admits two species: (A) *C. Eu-fragilis* and (B) *C. regia*. The latter he divides into (i) *fumariaeformis*, (ii) *alpina*, and also the form *deltoidea* of Dolomite formations.

I have had occasion to observe *C. alpina* for the last two years since I settled down in Lausanne near its main stations, and in its true forma *alpina* this fern is so striking that I can always recognise it from a distance owing to its crispy look, especially when it peeps out of loose stones as *Allosorus crispus* generally does. The forma *deltoidea* I have not yet seen. It is a very different thing when you take this fern home and grow it in your fernery, where it takes to cultivation kindly, though apt to be attacked by an orange fungus. Then you have generally to take a lens to distinguish it from *fragilis*. The fronds change shape entirely—they grow larger, are less divided, with broad instead of linear pinnules, and put on many sterile fronds, which they do not in their natural habitat. These sterile fronds often lack the notches characteristic of the species.

The description given by Dr. Stansfield is quite perfect for the altitude *alpina,* especially his forma *dissecta* ("tripinnati or quadripinnatifid"), but it does not answer for plants, taken from high altitudes and cultivated in the garden or in the greenhouse, which change their shape and habit entirely. The notches are the only characteristic by which they can be recognized and this only on fertile fronds. But is not this a general occurrence with flowering plants ? The higher altitude *alpinas* which accept cultivation at low levels are modified, sometimes to a considerable extent

What we must consider as exceedingly interesting is the fact that Dr. Stansfield and the pteridologists he mentions have succeeded in growing a strain of *alpina* which retains the alpine character under cultivation. There is no doubt in my mind that *alpina* is a good species. What is described under *regia* by Luersen, Christ, Ascherson and others is an intermediate and very variable form between *fragilis* and *alpina,* or (better) a lower altitude form of *alpina.* Every time I have been up to some summit where *alpina* grows I have found in the valley, beginning at, say, 1,200 metres altitude, some notched *Cystopteris* which are very much like the degenerated *alpina* I have in my garden. The lens is necessary to distinguish them from *fragilis.* The higher you ascend the more they approach *alpina* until you find the true form. These ferns I take to be plants grown from spores fallen from above. They are intermediate between *fragilis* and *alpina,* but not as crosses or subspecies, but simply as low altitude forms of *alpina.* The proof could easily be given by taking such plants and planting them on the top of the mountains from whence they originated. They would, I am sure, put on the *alpina* fronds and take the *alpina* habit, exactly as if I were to take the degenerated plants I have in my fernery and replace them where I obtained them. I may mention that *C. fragilis* co-exists with *alpina* up to 2,400 metres altitude. It grows there much smaller than below, but with the same characters and is readily distinguished without the use of a lens. I cannot, therefore, agree with Christ giving *alpina* as subspecies of *regia*. If there be a subspecies it is *regia* and *alpina* is the type. The description he gives of *regia* corresponds with the lower altitude forms of *alpina*. The same with regard to *fumariæfolia* of Ascherson. As regards the question of *C. alpina* being found only on calcareous mountains, in looking through the specimens in the herbarium of Lausanne University I have ascertained that, out of one hundred specimens that can be identified as true *alpina*, two only are from non-calcareous formations. I was much interested to find in the herbarium one specimen of English origin. It is, however, neither *alpina* nor *regia*, but is much like the form described by Lowe in "Our Native Ferns." I shall send to the *Gazette*, for the next issue, a photograph of *C. alpina* which I intend to fetch from the top of a mountain I can see through my window while writing, on the other side of Lake Geneva. The following are maximum altitude records above 2,000 metres in Switzerland according to Jaccard :—

Blechnum spicant	2,100	metres.
Lastrea montana	2,100	,,
Lastrea rigida	2,200	,,
Asplenium Ruta-muraria	2,350	,,
Allosorus crispus	2,400	,,
Woodsia alpina	2,400	,,
Athyrium alpestre	2,400	,,
Cystopteris fragilis	2,460	,,
Botrychium lunaria	2,470	,,
Asplenium septentrionale	2,500	,,
Asplenium viride	2,500	,,
Cystopteris alpina	2,700	,,

Allosorus crispus has since been found in Tyrol at 2,700 metres (Dalla Torre & Sarnthein, Fl. Tyr. VI., 1, 6), but as mentioned *Cystopteris alpina* has been found by Schroeter at 2,800 metres. Therefore our fern still beats the altitude record for the Alps by 100 metres and probably could be found even higher if systematically hunted for.

PAUL KESTNER (Lausanne).

February 21st, 1930.

(We have now ascertained that the *C. alpina* form a *dissecta* described in the December *Gazette* (Vol. VI, No. 1), was found by Mr. T. Ernest Waltham of Tulse Hill, London, who says that he collected it in 1926 on limestone rocks above Geneva at about 4,600 feet altitude (=1,400 metres approximately), and therefore well below the ordinary minimum altitude for *alpina* according to M. Kestner. The plant has been under cultivation four years in England and still retains its alpine character. Plants raised from spores of this plant have been sent to M. Kestner, who says they are "exactly like the alpine form."

Mr. Waltham says in a letter: "When I first saw *C. alpina* growing in Switzerland I never, for a moment, confused it with *C. fragilis*; its compact growth was so different and the shaping of its lace-like segments so distinct. Besides the blunt rounded segments which you describe, the way they turn back, like the partly open laths of a Venetian blind, struck me at once; the vivid greenness of the fronds was also unlike *C. fragilis*."—EDITOR.)

CYSTOPTERIS ALPINA.

I have, with Dr. Stansfield's encouragement and help, spent a good deal of time during the past three years trying to solve the mystery of this elusive little fern. I hope, therefore, that the Editor will permit me to add a few remarks of my own, from a somewhat different angle, to his illuminating article in last December's number of the *Gazette*.

With regard to nomenclature, I note that Dr. Stansfield employs the term *Cystopteris alpina*. If the fern in question is really the *Polypodium regium* of Linnaeus, then I suppose the correct present-day name, due to a change of genus, should be *Cystopteris regia*. On the other hand, as is pointed out, it is by no means clear from the specimens in the Linnean Herbarium in London for which fern the name was really intended, in which case *Cystopteris alpina* may be more correct. In Christensen's *Index Filicum* both names are given for the same date and authority (Desvaux, Prod. 264, 1827). In the appendix to Newman's "History of British Ferns" (1844), Latin descriptions are given under the heading of " Descriptions of European species of *Cistopteris*," by Roth, from the Flora Germanica iii, 94, of two separate ferns—*Cyathea regia* and *Cyathea alpina*. One or two Continental nurserymen list *alpina* and *regia* separately, but I have not been able to detect any important difference in the plants. The fern grower will probably prefer to retain the name to which he is most accustomed, and leave questions of priority to be settled by critical botanists.

The original habitat, on a wall at Low Leyton in Essex, will be familiar to most readers. Moore remarked that " at the close of last century, it existed in such plenty as to forbid the notion of its being, at that early date, an introduced species." A Mr. W. Tamplin stated that the appearance of the plant " was as if parsley had been sown along the wall." Against Moore's view is, of course, the fact that a lowland wall is a very unlikely natural habitat for a typically alpine plant. Other localities in this country given by some books have apparently not been authenticated, and after its extermination by building at Low Leyton, no more was heard of this fern as a British species until it was reported from Teesdale in Yorkshire by the late James Backhouse, who also found *Woodsia ilvensis* in the same place. Mr. H. J. Wilkinson, of York, writes that Mr. Backhouse told him personally that he had found the true *Cystopteris alpina* in Teesdale in 1872. There are no specimens of his gathering in the large herbarium at York Museum, and up to the present the only ones I have succeeded in tracing are two immature fronds in a small envelope in the Kew Herbarium, dated May, 1877. One would not care to give an opinion on such poor material. Enquiry among several North of England botanists who know the Teesdale Flora well has merely elicited the fact that none of the present generation had ever seen it. The site is given as Falcon Clints, between Widdy Bank Farm and the Cauldron Snout. This gives one a strip of precipitous basaltic cliffs a couple of miles long to explore. Two whole days and part of a third were spent by the writer and a friend in examining these rocks, which are fully exposed to the South, but without result. Nor were the *Woodsia* or the Holly Fern, which once occurred there, seen. *Cystopteris*, which in this country is a marked calcicole, was not, as might be expected, abundant on the basalt. Indeed, most of the plants, which were mainly of *dentata* type, were seen on small exposures of the limestone at the base of the cliffs. Mons. Kestner states that the true Alpine Bladder Fern as he knows it in Switzerland is never, or rarely, found off the limestone, which makes it all the stranger that it should have been found in Teesdale on volcanic rock.

Examination in London and elsewhere of several sets of herbarium specimens showed a considerable confusion with regard to the identity of the plant. Typical *fragilis* in every degree of subdivision, and other ferns including even young *Athyrium* fronds were found labelled as *C. regia* or *C. alpina*. It was difficult, therefore, to get a mental image from the specimens as to what this species should be like. An attempt was next made to obtain a cultivated specimen. Neither Kew nor the Edinburgh Botanic Gardens had it. Almost every nurseryman in this country who sold ferns listed it, but on enquiry had either sold out or sent something else instead. Plants were then obtained from several Continental sources, but Dr. Stansfield was not satisfied with their true *regia* quality. That sent by Mons. Correvon, however came very close to it. Dr. Stansfield, in judging these specimens, had in mind a plant which he knew some years ago, which was in a very fine state of subdivision, and he had therefore set a very high standard for this species. One almost despaired of ever finding the true thing, till one was fortunate enough to recognize a plant of it in Mr. Sherrin's conservatory at the South London Botanical Institute. Mr. Sherrin generously allowed the writer to remove a growing point with a couple of fronds. This piece was promptly sent to Dr. Stansfield for expert treatment, and as a result a fine form of the true *alpina* is now being raised in numbers from spores. As the Editor remarked, even the smallest sporeling shows the characteristic notching of the ultimate segments. It is only just to record that Mr. Sherrin's plant was found in Switzerland by Mr. T. Ernest Waltham, F.R.H.S., the well-known expert on Colour Photography, who has given me details of its discovery. He first saw it in 1911, growing abundantly among the limestone boulders of a dried watercourse above Lake Geneva at 3,700 feet. By 1914 the site had been completely destroyed by an avalanche. In 1926, however, Mr. Waltham found one solitary clump in the same region, but at a higher elevation. Part of the clump was taken home, and it is from this that the plants now in cultivation have been derived.

Dr. Stansfield has divided *Cystopteris regia* into two forms, *obtusa* and *dissecta*, and I think this is certainly necessary if one is to unite such diverse forms as those of M. Kestner and of Mr. Waltham. While the best forms are very distinct and easily recognized, one's personal experience of living and herbarium specimens, stated to be the Alpine Bladder Fern, leaves a doubt as to whether the plant is really deserving of specific rank. I see that Dr. Druce, in Hayward's "Handbook," places it as a variety under *fragilis*. As Dr. Stansfield has shown, spore characters are not very helpful, although the "prickliness" of the spores seems to vary in proportion to the dissection of the fronds. If the true *regia* must be tri-quadripinnate, with linear notched ultimate segments, the veins of which terminate in the notches and not in the apices of teeth, then the standard set is a very high one, and it is feared that most of the so-called *regia* forms fall short of it. Subdivision varies considerably with stage of growth and cultivation and such factors must be taken into account. But whatever the final verdict may be, fern-lovers will be glad to retain the term for such beautifully dissected forms as are now being distributed.

S. P. ROWLANDS.

[M. Correvon's plant was similar to one of the specimens of *Polypodium regium* in the Linnean herbarium which we considered to be a divided form of fragilis and not the true *alpina* of Desvaux.—Ed.]

FERN EUGENICS.

The raising of new varieties of ferns up to the present has been largely, though not entirely, a haphazard affair. Fern breeding has been mainly confined to two or three nurserymen and a comparatively small group of enthusiastic amateurs and of late years the numbers of both these sections have been seriously depleted by the deaths of Mr. C. T. Druery, Mr. W. H. Phillips, Mr. George Whitwell and Mr. H. Stansfield, and by such firms as Messrs. H. B. May & Son going out of business. Of those who remain several (like the present writer) are getting rather ancient and cannot expect to keep it up much longer. It is desirable, therefore, that recruits should be found for both sections of this very small army. The trade section is, naturally, concerned chiefly with the production of saleable stock, but, in this process, new varieties appear from time to time and are eagerly seized and propagated as in other branches of horticulture. Of the non-commercial section some, such as the John Innes Institute, are primarily interested in the working out of purely scientific problems and take no account of the production of new beautiful and desirable forms for garden purposes. Many growers, both trade and amateur, have " tried their hands at crossing." Most of them, however, have been content to raise a new variety without sufficient care that the new form raised should be a desirable one. For the working out of biological problems it is of no importance whether the crosses produced are beautiful or the reverse—indeed ugliness is sometimes an advantage inasmuch as odd and grotesque characters are more easily recognized in the offspring. The fern-lover whose object is the production of beautiful things for the garden should, however, give careful consideration, in making crosses, to the ultimate result aimed at. There has been, in the past, too much crossing of very dissimilar things with the object of getting merely something different. The parents selected should be *compatible with each other* as well as beautiful in themselves; otherwise the result is apt to be the production of more or less ugly mongrels. The crossing of plumose with crested ferns, which was frequently attempted in the early days of fern-breeding, generally results in spoiling both types. There is no cross-bred modification of *A. f.f. kalothrix*, for instance, which is as beautiful as the original type and the crested forms are all more or less unsymmetrical. *A. f.f. Craigii*, which is a fertile breeder and a dominant parent, invariably spoils anything with which it is crossed. While there are so many beautiful and regular varieties, imperfect and unsymmetrical forms should be avoided like the plague as factors in breeding. Also it is not sufficient that the actual parents should be true to type and of correct character. They should also be of *pure and unmixed descent*, otherwise objectionable characters which are latent in the parents may come out in the offspring. Animal breeders are careful to obtain pedigree stock for their parents, and plant breeders should be no less careful to avoid contaminated protoplasm in theirs. It is well, in attempting a cross, to use spores of the original wild find whenever possible, since garden-raised plants, although apparently of true character, may contain in their germ plasm latent determinants of other varieties and undesired or objectionable traits may come out in the offspring. A good example of a successful cross is the *P. angulare divisilobum perserratum*, which was distributed by the late Mr. Phillips. although there is some doubt whether it was actually raised by him. The two parental characters do not jar at all, but blend beautifully and the result is a charming and constant new variety. In *P. angulare* crosses between plumose forms, on the one hand, and polydactylous or *lineare* forms on the other, are to be deprecated. It is true that sometimes very beautiful children may be the immediate result, but one never knows what the mongrel will do next ; it rarely continues in the same character for many years.

Cross-breeding is not, of course, the only method of raising new varieties ; indeed most of the best new garden varieties have been raised by simply breeding from good types with careful selection of the offspring. An example of this kind of breeding is seen in the many beautiful forms which have been raised of and from the Jones-Fox strain of *plumose divisilobes* in *angulare*—plumose and ultra-plumose, *rarefactum* and *pulcherrimum* forms in bewildering variety have come from this strain without any crossing whereas whenever an attempt has been made to cross it the result has invariably been to spoilt it. Even in breeding from pure strains rigid selection is necessary as there are sure to be some rogues or "throw-outs" which should be destroyed without mercy and almost every large miscellaneous collection contains some examples of these.

F.W.S.

ADIANTUM CAPILLUS-VENERIS.

On account of its lack of hardiness this species is but little grown by cultivators of British ferns, while its comparatively small size and slow growth make it not a paying crop to the cultivators of greenhouse and hothouse ferns. It is, however, the type of the genus and probably the first one that was known to botanists. As it is a truly British fern, and one of the most distinct, it is a pity that its culture should be neglected. Its requirements are not very difficult to supply, but one of them is absolute freedom from frost, so that for most parts of these islands not only glass protection but also artificial heat is essential. Given these, and a light peaty soil containing lime in some form or other and the moist atmosphere demanded by most ferns, its cultivation presents no difficulty. It dislikes, however, having its fronds wetted, so it should not be watered overhead. We have seen it somewhere growing in the chinks of the brickwork on the *outside* of a warm greenhouse, but the fronds disappeared every winter although the brickwork retained sufficient warmth to preserve the roots and rhizomes alive. The consequence was that it never grew to anything like its full size and never looked happy except for a short time in the summer and early autumn. The species has never been much hunted for varieties and very few of any note have been found wild. Almost the only one of these which got into general cultivation was *A. C. V. Cornubiense,* found by Mr. H. H. Trevethick in Cornwall in 1868. When well grown this beautiful fern was almost a rival of the magnificent *A. Farleyense,* though it never showed the pink tones of that favourite hothouse fern. *Farleyense,* however, was not a wild find, nor did it originate in this country, but was raised under cultivation at Farley Hill in the island of Barbadoes. It is a matter for the deepest regret that *Cornubiense* has disappeared from cultivation so far as the writer has been able to discover after prolonged inquiry among those establishments most likely to possess it. It may be that it still survives in some private collection from which it may eventually reappear before the public view. Should any of our readers know of a living plant we hope they will record the fact of its existence. Failing *Cornubiense,* the finest variety at present known is *A. C. V. imbricatum,* raised by the late Mr. E. J. Lowe, though from what source is not recorded. Mr. Druery in his "British Ferns and their varieties," indeed "presumes" that it came from *Cornubiense,* but as there is no direct evidence that the latter ever produced seedlings, the presumption is somewhat doubtful. The present writer thinks the Irish *A. C. V. magnificum* a more likely source as it is at least fertile and a vigorous grower like *imbricatum.* This is, however, a mere guess and is perhaps entitled to no more respect than Mr. Druery's speculation. *Imbricatum* is worthy of attention as a parent and we have at present a batch of seedlings coming on (although as yet very small) from which it is hoped that something of interest may be produced. Mr. MacSelf has a fine specimen of *imbricatum* of which we hope sometime to obtain a photograph for reproduction, though the plant is not at the present moment in a condition to be figured, the new fronds being immature. Other forms which have been found are *plumosum,* Dadds (Jones), found in Cornwall, and *incisum Footii* (Lowe), found in County Clare, both fine things on the same lines as *Cornu-*

biense, but now apparently lost. Varieties raised from spores were *Daphnites* and *spectabile,* both of which received certificates from the R.H.S. Mr. Lowe records that *spectabile* was "a close copy of *Farleyense.*" Both of them have now disappeared from general cultivation, if not altogether. There is, however, no reason why these or similar (and also different) forms should not be found or raised again ; there is plenty of scope for hunters and raisers so far as this species is concerned. Who is to be the discoverer of the new British *Farleyense* or *plumosum* ? Irish hunters, now is your chance.

F.W.S.

SOME RANDOM REMARKS.

Modern Botany is concerning itself increasingly with questions of Ecology. Why do certain plants favour certain conditions regarding altitude, aspect, soil or position ? There are some morphological characters which are fairly obvious, such as those which enable some plants to exist under desert conditions, and permit others to live in sour bogs or under water. There are many other factors, however, governing plant associations in certain habitats which are not yet fully understood. A great deal of work is being done in studying the alkalinity or acidity of soils, and the p H values are being gradually worked out in connection with our British Flora. Ecological investigations would, of course, include our British ferns, and many interesting questions await an answer. Why, for instance, should *Lastrea rigida* be almost confined to a small area around Ingleborough when there are hundreds of other apparently suitable places, and when, in fact, the plant causes no difficulty under ordinary garden conditions ? Why should the Hart's-tongue show itself in the wild state to be an undoubted calcicole, when it can be grown splendidly in peat moss litter ? The Common Polypody is well known to grow well in the mortar of old walls, and as well or better in pure, lime-free, vegetable soil. This same characteristic may sometimes be seen among the flowering plants, as in the case of the Bitter-sweet, which may be found growing on a dry chalk hill as well as in the comparatively acid soil around a pond at the bottom. I have myself seen our beautiful little Grass of Parnassus, typically a plant of damp bogs and moist heaths, flowering profusely on a dry ledge in a limestone quarry. Some plants, therefore, seem to find their needs equally satisfied by a dry calcareous soil or a moist peaty one. It has been suggested that the essential factor is in some way connected with the water supply of the plant, but much work remains to be done before the mystery is cleared up. *Blechnum Spicant* and *Lastrea montana* are two common ferns which seem to have a genuine dislike for lime in any degree, and among the others, *Lastrea dilatata* is usually considered a lime-hater. But during the past season I have come across quite a number of plants of the Broad Buckler growing happily with the Male Fern and *Polystichum* in an old magnesian limestone quarry near here. This suggests the question as to whether the magnesian limestone of the Permian formation differs markedly from the plant's point of view, from other forms of limestone. Can it be considered a specially mild form of lime ? In a friend's garden, the Lady Fern grows quite happily in a soil consisting chiefly of magnesian limestone fragments. Dr. F. A. Lees, in his "Flora of West Yorkshire," points out that *Cystopteris fragilis* is common on the mountain limestone, but rare on the Permian, suggesting therefore that the two forms of limestone are not equally acceptable to this plant. Such problems as this will doubtless be solved when the Ecologists have done their work.

I have often thought it curious that foreign ferns do not appear more frequently among the alien flora of this country. The list of the flowering plants that have been found as casuals about docks and railways and as escapes from gardens is a very long one, but apart from the Sensitive Fern, *Onoclea sensibilis*, an American which takes kindly to our country in suitable places, I cannot remember hearing of a foreign fern establishing itself over here. Probably spores do come over with foreign grain or packing material, but presumably conditions are in the main unfavourable for successful germination and development.

This leads to another thought. What happens to the myriads of spores which are annually produced in this country by our common Bracken ? Fern growers know only too well how readily stray spores of this plant will invade their greenhouse pots, but how often does anyone see a Bracken sporeling in its natural haunts. Several competent botanists whom I have asked candidly admit they have never seen one. Perhaps the sporelings are easily overlooked in the usual jungle of Bracken, but my own impression is that extension of a colony occurs almost entirely by growth of the underground rhizomes and not by spore germination. Practically all the sporelings I have seen have been on old damp walls, and more than one good botanist has been puzzled by these unusual occupants of the walls. Naturally the young plants do not survive for long in such positions.

Is the Common Polypody particularly sensitive to an impure atmosphere ? This question was suggested by the fact that in this town, surrounded now by a ring of collieries, practically the whole of my outdoor collection of Polypodies has died out in three years. Although this fern was frequently found in neighbouring woods before the collieries came, it is now practically extinct. I feel sure that Dr. Stansfield's view is correct, namely, that the Polypody *is* very sensitive to atmospheric impurities. Further, that as this species is late in producing its new fronds, it has special need to retain its old fronds during winter and spring—a thing it cannot do in a smoke-laden, foggy climate. While it can be considered an easy-going plant in most places, it requires the shelter of a frame or greenhouse in many of our manufacturing towns.

S. P. ROWLANDS.

VARIETAL TYPES OF BRITISH FERNS.

By Mr. CHAS. T. DRUERY, F.L.S., V.M.H.

(*Read at the Meeting of the British Pteridological Society, at Bowness, Windermere, August 3rd,* 1903.)

In comparing the varietal types of exotic ferns with those which have arisen as wild sports in our British species, no one can fail to be struck with the immensely greater diversity of the latter, a very large number having no similarity at all with exotic abnormalities. This is, perhaps, one of the most remarkable facts in connection with our cult, especially when we consider the immense number of exotic species as compared with home ones, while, so far as we have been able to gather, there is no special factor in these islands which cannot be common to many other islands as well as continental fern habitats. The abnormal exotic forms in our collections are relatively few, and consist mainly of cristate and plumose types in which fronds otherwise normal possess larger or smaller tassels at their terminals, or vary on the line of our own *plumosums* by extended subdivision associated with a lack of spore production. The innumerable forms of *Pteris serrulata, tremula,* and *cretica,* which constitute the bulk of trade ferns, originated too, not as wild sports as with us, but through selective culture by a large number of nurserymen who have raised them in such enormous numbers that it would have been odd indeed if they had not yielded an abundance of sports. All these, however, are mere varieties of the two types cristate and plumose, and we look in vain for the cruciate, or truncate, or muricate, etc., types of which we have so many, to say nothing of the subtle variations of the normally outlined frond such as we see in *A. f. f. Vernoniae, conioides,* the *setigerum* section, and many others. Exotic *polystichums* also figure in catalogues, and yet despite their close relationship with our three species, there is nothing to show beyond a single typical *grandiceps* found in the States. That charming fern, *P. setosum,* despite its long culture, has never swerved in the least from its allegiance to the ancestral type to endow us with such feathered and tasselled gems as its more ambitious relatives here have done. Some botanists, the Kew authorities among them, class this as a form of *aculeatum*, a pill which it is hard for most of us to swallow and impossible for the writer.

There has been a tendency lately to impute all variation to crossing or intermixture of specific forms, or to reversion to ancestral types, but we cannot certainly accept such an explanation of the sports in British ferns. In the first place, we all know that several of our species, to wit, the Lady Fern, Hartstongue, and Blechnum are the sole representatives of these genera in this country, and that all these, the first two especially, are extremely prone to sport ; and, in the second place, as regards reversion, where is the sport (outside the merely extra divided ones) which can be pointed out as in the remotest degree resembling any specific form, either extant or fossil ? A curious fact in this connection is, that though it is only reasonable to assume that sports must have played a part in the production of species, since every constant distinct form which comes true from spores fulfils every specific qualification yet defined, there is absolutely no crested species in existence, at any rate, none has yet been discovered : and yet almost every species, if it vary at all, is more apt to vary in this direction than in any other, while the faculty of cresting, unlike that of plumation, detracts not at all from the normal spore production. This in itself is singular, since we impute the entire or partial barrenness of all true *plumosums* to the spore producing energy being diverted to foliar formation ; and yet, though the production of heavy tassels would seem to imply an equal drain upon the plant's resources, even the tassels themselves are often so crowded with sori that the spore yield is largely increased instead of diminished.

The main types of variation, as we have seen, are cristation, or the production of tassels, and plumation, an extra division in the case of divided ferns, or extension of area in undivided ferns. Cristation, or tasselling, also properly embraces the branching of the rachis of the fronds at any point and to any extent, since it is caused by the same peculiar faculty in the formative cells of splitting into two or more mother cells, each of which then goes on building up an independent frond, if it starts early enough, or an independent subdivision, if it divides later on. In the merely tasselled forms this splitting up does not take place until the frond is nearly completed, and in the symmetrical types it takes place regularly at a certain stage of development. This faculty varies in degree from a mere forking into two at the frond tip, which occasionally occurs in otherwise normal plants, to heavy fanlike or corymbose developments, produced by its repetition over and over again, so as to form strands with subsidiary tassels, as we may see in *A. f.f. multifurcatum.* In branched forms this splitting may take place at so early a stage that the fronds are divided at the very base of their stalks as in *A. f.f. Frizelliae nanum ramosum,* in which four or five fronds rise at once with the semblance at first of a closed fist in lieu of a single coil. This branching also varies in degree ; in the example just cited it goes no farther, and each frond branch is typical of the variety but naturally dwarfed, the whole group being really one frond despite appearances ; but in other cases it is repeated over and over again until we have the extreme cases of *A. f.f. velutinum* or *unco-glomeratum* and *Scol. v. Kelwayii densum,* which resemble balls of fine moss, all trace of the normally flat frond being lost, and the two widely different species rendered so similar as to be easily mistaken for each other.

In connection with tasselling proper as well as other characters, it is to be observed that the fundamental plan of the frond is generally also that of its subdivisions, its development depending entirely upon size. Thus it is the rule, when a frond bears a terminal crest, that the side divisions or pinnæ bear smaller ones of similar pattern, and if the crest be large and the fern robust, the tertiary divisions or pinnules will fan out also. In the case of the writer's *A. f.f.*

superbum percristatum, and in the best form of *Pteris aquilina cristata* this goes even a step farther, the pinnulets or ultimate divisions being also distinctly forked, a remarkable example of the splitting up of the mother cell at a definite period of development. On the other hand, it occasionally, but rarely, happens that fronds with good terminal crests show no signs of cristation in their pinnæ, and in Moly's and Grey's *Polystichums, cristato-gracile*, the converse case occurs, where the small subdivisions are distinctly tasselled, the pinnæ only small tasselled, and the frond tip but little divided. Nature here, as ever, delights in upsetting any hard and fast rule which man may try to deduce from her procedure. In those male ferns which are termed "rogues," known to every fern hunter and by no means rare, we have an example of this splitting on erratic and inconstant lines, sometimes temporarily assuming such tempting forms to the beginner, that they are captured as treasures, only to assume the common form under culture.

The converse case, however, as usual exists, and this occurred in the writer's experience. A splendid, apparent thoroughbred, polydactylous male fern, without a trace of that irregularity which the experts can usually detect, and with tassels of twenty to thirty points at all terminals of its yard-long fronds, was found in Scotland and pronounced by so eminent a judge as Colonel Jones to be the finest form then found. Next year it was an arrant, ragged "rogue," depauperate all over, and with only a tag of a tassel here and there to denote the high estate from which it had fallen, and thus it has remained ever since. Several other exact counterparts were subsequently found near-by, and all behaved in the same scandalous manner when removed, even in their native Scotch air. Spores, of course, were sown as soon as ripe, and before the delinquency was detected, and a big posse of youngsters appeared in due course, ragged "rogues" even in their cradles—all but one. This one, which forms the converse case in question, evidently had collected enough blue blood in its veins to withstand the inheritance of parental baseness, and in time developed into a thoroughbred of the precise type of the original find, and thus redeemed the "character" we had thought for ever lost.

With the other main varietal section, the *plumosums,* we must class also the *decompositums,* accepting as true *plumosums* only those which are absolutely barren, such as the true *crispum* section of the hartstongue, the *cambricum* section of the common polypody, and the *incisum* section of *Asp. trichomanes,* adding perhaps the microdon forms of *Asp. ad. nigrum* and *lanceolatum,* and the plumose variety of *Asp. marinum.* The fertile forms, even including the *plumose divisilobes* of the *polystichums,* really grade so much into each other that we are bound to lump them in describing their peculiarity, which is a continuation or extension of these divisions on more or less normal principles. Thus in the Holly Fern we have a type of *Polystichum* consisting of a once-divided frond, i.e. two rows of the characteristic mitten-shaped pinnæ attached to a central stalk. In *P. aculeatum* and *P. angulare* we see this division carried normally one step farther, so that the pinnæ resemble roughly *P. lonchitis* fronds. This is the normal range, but in many varieties we find this division carried farther and farther still, accompanied by modifications of the shape of the subdivisions or mittens and the length of their stalks, until we arrive at the *plumose divisilobes,* which are rendered densely mosslike by the multiplicity, length, and piled up character of these ultimate divisions.

In classifying these divided forms of the Shield Ferns, the shape of the ultimate divisions has been taken into account as well as their grade, the *acutilobes* having them long and very acutely pointed, and the *multilobes* of a rounded form. The latter name, however, is obviously an unhappy one, as it properly applies to all decomposite forms; an excuse, however, is to be found in the great difficulty of finding descriptive names which would not be cumbrous and pedantic, for the almost innumerable forms assumed by the subdivisions independently of their multiplication. Here, indeed, *Polystichum angulare* is an easy first in versatility, even among British fern varieties, for with all the diversity of *Athyrium* forms, this peculiar faculty is far less in evidence in that species. The extremes, perhaps, are shewn in *P. ang. rotundatum*, with almost round pinnules, and any one of the finest *acutilobes* with linear pointed ones ; or perhaps a better example is seen in that unique form *P. ang. Baldwinii*, with almost hairlike pinnulets or pinnuletines to carry the diminutives far enough. In Birkenhead's marvellous *P. ang. plumosissimum* we reach, however, the acme of plumation, fully justifying its name, since although it does not divide so finely as *Baldwinii*, the ultimate divisions continue their growth apparently indefinitely by producing long tongue-like extensions which heap themselves upon the fronds like a mossbed, and are capable, if severed and layered, of continuous development through prothalli into a new typical generation. This, so far I believe, has not produced spores and may therefore serve to lead us to the consideration of the absolutely barren or true plumose forms. In the *Polystichum* family these are very few, in point of fact until quite recently I should only have pointed to *P. aculeatum pulcherrimum* with any degree of conviction, and this has been upset by the discovery by Dr. Stansfield of perfect sporangia on a plant given by me to Mr. Green, and I am happy to say that at least 150 spores were visible as shed from the capsules I gathered, and, I need hardly say, have been sown with the utmost care. In the *Athyria* also, despite the abundance of accepted *plumosums* on divided lines, I know of none which are absolutely barren, either of spores or aposporous growths which take their place. Barnes' is reputedly barren, but I once had an extremely fertile plant, a division of the original, and considering its only medium plumose character as compared with others its general infertility is a puzzle. So far indeed from the *plumosums* in this species being barren, a number of them supplement their spore heaps by associated bulbils, and this faculty seems even to be enhanced by extra division, as I have a pan full of young *plumosums,* Druerys, all raised from the bulbils on a single pinna. In the *Cambricum Polypodies,* the true *crispum* Hartstongues, and the *incisum Asp. trichomanes,* however, we find the spore-producing capacity utterly suppressed, and I am not aware of any established record of an exception.

Having now dealt, though very superficially, with the two main branches of fern variation, we may consider some of the minor ones. As a set off, as it were, to the superabundant folioseness of the plumose or extra-divided types, we have an immense number of the converse kinds, the *lineares, depauperatums, truncatums, marginatums, angustatums,* and so on, to which we may also add the dwarfs, and in this last direction undoubtedly the Lady Fern scores off its rival the Shield Fern since, despite its normally larger size, with the exception of *P. ang. Lyellii,* there are no tiny gems to compare with *A. f.f. congestum minus, minimum, frizelliae ramosum, crispum, velutinum,* and some of the dwarf forms of the orbiculare type. Nor can we find parallels, on the larger scale, for *A. f.f. Victoriæ, Frizelliæ, excurrens, medio-deficiens* (*abasilobum*), *caudiculatum* (*Phillips*), *Pritchardii, Vernoniæ, conioides,* and a number of *flexuosums.* In the *lineare* types we find normally wide divisions reduced to little more than midribs or very much narrowed ; but here comes in the confusing elements of varied naming, for instance, in *Blechnum spicant lineare,* Barnes, we have nothing akin to *P. ang. lineare,* they are not the same types at all. The *Blechnum* is a simple or undivided form of the species, while the *Polystichum* is divided on specific lines, but divested, more or less, of its leafiness.

The depauperate section we may dismiss at once, as it embraces a line of forms which, being imperfect, we set our faces against in this Society. *A. f.f. depauperatum* is, however, an exception, being really a misnamed pretty *cristatum.*

Truncate forms, which embrace the *excurrens* type, are very curious and seemingly unnatural in plants which grow as ferns do, by development of their apices ; and yet, as we know, it is a comparatively common wild variety in *Lastrea montana* ; we have it more rarely in *L. filix mas* ; it occurs in the *excurrens Athyria* ; and many finds and forms of the Hartstongue of the *peraferens* and *cornutum* types are simply the same type under other names. In all these the frond and side divisions end abruptly, and the midrib projects like a thorn or bristle. It is a curious fact that this form finds specific expression also in the leaf of the tulip tree (*Liriodendron tulipiferum*). Strangely enough, we find no example of a thoroughbred *excurrens* type among the *Polystichums*, i.e. with the character exemplified in the subdivisions as well as the frond tip.

Another peculiar type of variation is that of brachiation, in which the basal divisions of the frond, normally short or narrow, are abnormally developed, sometimes into secondary fronds. In *Polystichum* we have numerous examples of this, of which Keall's appears to be the most striking ; in *Blechnum* we have several examples known as *trinervium*, and Mr. Forster's *plumosum* has frequently a percentage of fronds so characterized. In the Hartstongues it appears under the heading of *sagittatum*, but, curiously enough, we find no examples of a marked character in any of the other species.

Cruciation, or the duplication, of the secondary and even tertiary divisions, and their setting on at an obtuse angle to each other, is a very remarkable type indeed, and finds its utmost expression in *A. f.f. Victoriæ*, which it pervades throughout in the original find, though not always in the seedlings. This also seems limited to a few species, i.e. in a thoroughbred form. In *Athyrium* we have *Victoriæ* and *Pritchardii* as two examples, and Mr. Lowe records no less than 59 forms under this section, of which, however, only eight were wild finds. I found, however, a form in Devonshire some years ago which had two or three pairs of cruciate pinnæ near the top of each frond and a tendency to cruciation in the pinnules, and from this I have raised a thoroughbred cruciate caudate form, not so far catalogued. In *Lastrea* I know of two examples only, *L. f.m. Tyermannii,* occasionally cruciate near the terminal crest ; and *L. dil. Howardæ,* pervaded with cruciate pinnules. In *A. f.f. Pritchardii* we see cruciation extended into a partial bunching, which probably is a step towards *Frizelliæ,* which forms the nodose, or knotted, type, of which no parallel has been found in other species.

Surface variation we naturally only find in such a fern as the Hartstongue, but in that species it takes several forms, and combines with many others to swell the list of varieties to which that marvellous fern has lent itself. Rugose, muricate, scalpturate, marginate, and supra and sublineate types explain themselves ; and to these may be added the viviparous type exemplified in O'Kelly's *cristatum.*

In this same species we must mention the *projectum* series, including *laceratum,* in which it is obvious the fern is trying to assume the pinnate form, a converse case to Barnes *lineare Blechnum,* which endeavours, and not unsuccessfully, to ape a narrow Hartstongue. Allied to, but different from, the *projectum* type, is the fimbriate one, exemplified in Stansfield's and Cropper's charming forms and in *S. v. crispum Drummondiæ,* and its improved offspring, and this brings us to the small but interesting section of the aposporous ferns which, as an up-to-date list appears in the Society's Book of British Ferns, I need not here recapitulate, although I take this opportunity of recording my recent find of an aposporous seedling of *P. vulgare,* variety not yet determined.

(*To be continued.*)

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

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Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, "Monkhams," Lower Road, Great Bookham, Surrey.

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EDITORIAL NOTES.

We have received copies of the " American Fern Journal," Vol. 20, No. 2, which contains an important article on the genus *Cyrtomium* by Dr. Carl Christensen, in which that genus of ferns is exhaustively described, and others by G. Looser on the " Ferns of Central Chile," by Douglas H. Campbell on " Some Reminiscences of Fern Collecting," and by F. W. Stansfield on " Variation in British Ferns, &c." Dr. D. H. Campbell's article is of absorbing interest, his travels having been largely in tropical and sub-tropical countries, including the Sandwich Islands, Jamaica, Java, Borneo, Sumatra, Ceylon, The Malay Peninsula, Australia, New Zealand and South Africa. This botanist is not of the dry-as-dust order as may be judged from the following extract :—" The great object was to secure material showing the development of the reproductive organs and embryo, especially of certain types which there was reason to believe were the older and more primitive forms, whose development might throw light upon the evolution of the more recent fern types. Such collections included, not only the fully developed fern or 'sporophyte,' but the often very small and inconspicuous sexual plant—the gametophyte or prothallium—which is quite overlooked by most collectors, but is of the first importance in studying the life history of the fern." This number of the Journal is, we understand, a special anniversary publication and contains several illustrations of which the most striking is a plate showing ferns in the Botanical Garden, Buitenzorg, Java.

The "Gardeners' Year Book" (British) has an article on "British Ferns," by F. W. Stansfield, contributed by special request.

We have received from a former member, Mr. Alfred Kirby of Cardiff, fronds of a ramo-cristate *Lastrea* recently found wild by him. It is supposed to be a form of *L. æmula*, but the fronds are too small and the specific characters not sufficiently developed for us to make quite certain that it is really *æmula* and not *dilatata*. If it should prove to be the latter species, the plant may be something like *L. d. grandiceps* found by the late Mr. J. M. Barnes. If really *æmula* it will be an interesting and valuable find as there is at present only one known variety of that species and the new find is certainly quite distinct from *L. æmula cristata*, Gill.

For the illustration, in the present issue, of the Meeting in the Kent Valley, our thanks are due to Mr. J. A. Sinclair who took the photograph, had the plates reproduced from it, and presented them to the Society ready for insertion. Mr. Sinclair himself appears in the group of members.

The Hon. Treasurer, Mr. J. J. Sheldon, will be glad to receive remittances of any subscriptions for the current year (now due) or for any arrears which may remain unpaid.

OUR FRONTISPIECE.

Polystichum angulare divisilobum, Bland.

The illustration is from a photograph of a plant, in the collection of Mr. T. E. Henwood, which was sent to him some years ago by Mr. J. E. Austin of Detling near Maidstone.

The original plant was found wild, by the late Mr. J. H. Bland of Tobarcooran, Carnmoney, Co. Antrim, only a few miles from Belfast. It is not only the best *divisilobum* ever found wild but is undoubtedly the finest pure divisilobe in cultivation, notwithstanding the number of beautiful forms found wild and the still greater number raised from spores of the Jones-Fox and other strains. Probably no one has grown it more successfully than Mr. Henwood, though no doubt, if well treated in Dorset or Devon or in some parts of Ireland it might surpass even this splendid development. It produces bulbils freely, but for some reason these have been found to be not very easily grown into plants as they are rather apt to dry up when the fronds are laid down in our arid and comparatively ungenial climate. In a more favourable district there would probably be no difficulty in raising it from bulbils. It also produces spores freely but we are not aware that it has been raised by this means, the apparently quicker method of raising from bulbils being too much of a temptation to growers. This fern was previously described, and its history given, in the Editorial Notes of the "Gazette," Vol. IV, Nos. 7 and 8, *i.e.*, December, 1920, and March, 1921.

THE HARDY FERNS.

AT SOUTHPORT SHOW.

Highly satisfactory progress in the Hardy Fern section of this great show may be recorded. A separate tent of considerable dimensions was entirely devoted to the exhibits, and this was comfortably filled.

There were four groups in the Challenge Trophy class, and all were very good although none so perfect as to leave no room for criticism.

Mr. W. B. Cranfield won this class for the third time, thus becoming permanent owner of the "Abol" Fifty Guinea Challenge Cup.

The arrangement and constitution of Mr. Cranfield's group was much upon the lines of former occasions. His fine specimen of *Athyrium F. f. Clarissima* provided the central feature, and the big plumose and divisilobe Polystichums afforded it substantial support. Crested *Lastreas* and an *Osmunda* helped to fill in the background. These, by the way, provided those who were keen to criticise with the chance they sought, for in banking up as high as possible in order to provide a good slope, the exhibitor ignored the fact that a back view was given from the other side of the tent, and here, naturally, the rougher and somewhat damaged fronds were exposed. The end of the group also was not too neatly finished off, a few holes and patches of moss being discernible.

It says much for the magnificent quality of the ferns in the group that what blemishes of this nature there were could not bring the exhibit, as a whole, down from its unquestioned position at the head of a series of fern groups such as the oldest exhibitors have seldom seen together. It would simply mean stringing together the names of some of the best ferns in cultivation to enumerate the choice examples that played a part in Mr. Cranfield's exhibit which was a centre of admiring inspection by enthusiasts and the general public throughout the show.

It is with mixed feelings we learn of our President's intention to refrain from competing in this class next year. We shall feel and regret the loss of so magnificent a group of plants, but realize that behind the decision is Mr. Cranfield's anxiety that other competitors shall not entertain the idea that he will afford them no chance to share the honour of winning the trophy. As the writer has prevailed upon Messrs. Abol Ltd. to provide another Trophy, it is sincerely hoped that several new competitors will come forward and ensure that the loss of our President's entry will not rob this class either of spectacular effect or educational value.

The second prize group, staged by Mr. Lovelady, was rich in the smaller species and varieties, and was arranged with good taste. A few more large specimen *Polystichums* would have made a powerful difference to general effect, but close inspection gave a deal of pleasure to the connoisseur.

The third and fourth prizes went to Mr. J. Lloyd of Birkdale and Mr. W. Low of Southport, respectively.

We missed our friends George Oliver and his sons who were unable to come down from Scotland this year, but by correspondence we have learned that their ferns are making good headway, and it may be hoped that next year another group from Melrose may make its mark, for the Messrs. Oliver have undoubtedly some very fine ferns.

A very remarkable improvement was manifest in the classes for plants in pots, starting with a dozen in distinct varieties and including various classes for three of a given genus.

Mr. Robert Bolton and his son, Thomas, both of whom are as keenly enthusiastic for hardy ferns as any of the members of the Bolton family have been for half a century past, put up some magnificent plants in almost every class and accounted for a full share of the prizes. Mr. Robert's first prize set of a dozen included a very fine *Polystichum angulare plumosum* and *P. a. elegans* and exceptionally good *Scolopendriums, cristatum* and *crispum*. An *Athyrium gemmatum* with depauperate stems and tremendous heavy crests was a very distinctive item and there was also a good form of *Polypodium v. Cambricum.* Mr. Thomas Bolton followed his father in this class, Mr. W. B. Cranfield coming third.

In the class for six, Mr. Robert Bolton again headed the list and in this set *Scolopendrium v. undulatum cristatum* was an outstanding feature. Mr. Cranfield came second here, Mr. Thomas Bolton being third. These three exhibitors rung the changes with each other in most of the classes, but in that for three Polypodiums, Mr. Cranfield was first, followed by Mr. J. Lovelady, with Mr. Robert Bolton third. Mr. Cranfield's varieties were *P. v. Cambricum*, *pulcherrimum* and *omnilacerum* (Oxford variety). Three good *Polystichums* won

Mr. Cranfield first prize, his varieties being *P. aculeatum gracillimum*, and *P. angulare acutilobum* and *capitatum.*

In the class for one British fern raised by the exhibitor Mr. Robert Bolton scored with a very beautiful plant of *Scolopendrium crispum cristatum*, a plant which was greatly admired and favourably commented upon by the fern lovers who attended the Show.

Whilst everybody may justly be pleased and proud of this year's display, let us look forward to still greater things in 1931. One or two alterations in regard to classes and staging matters are already under the consideration of the Southport authorities who have, from the beginning, shown themselves most anxious to help in every way possible to make the Hardy Fern classes just as the growers and exhibitors would wish them to be.

In view of the fact that the annual meeting of the Society is fixed to be held in Southport during the week of the Show we may surely anticipate a much larger attendance of members both in the exhibition tent and at our own Annual Meeting.

THE ANNUAL MEETING.

The Thirty-fifth Annual Meeting of the Society was held on Monday, September 1st, at the County Hotel, Kendal, Westmorland, the president, Mr. W. B. Cranfield, occupying the chair. Members were present from Enfield Chase, Kendal, Dublin, Welwyn, Great Bookham, Grange, Halstead (Essex), London, Warlingham, Southport, Lancaster, Haslingden and Reading. The President welcomed the members present and congratulated them upon meeting once more in the original home of the Society. The Minutes of the last meeting were read, confirmed and signed. The Hon. Secretary read his report as follows :—

Mr. President, Ladies and Gentlemen,

The past year has been a comparatively uneventful one in the history of the Society. For fern growers it has been a time of slow and partial recovery from the effects of the disastrous winter and spring of 1928-29. The number of ordinary members is now 125 and there are 8 honorary members.

Mr. Charles E. Pearson of Lowdham, Mr. Joseph Wiper of Vancouver, B.C., and Miss B. Stanby Rogerson of Dunblane, Scotland, have died. Mr. Wiper was one of the founders of the Society ; Miss Rogerson was an old and faithful member ; while Mr. Pearson, although a comparatively new member, was an old fern grower and a distinguished horticulturist.

Four members have resigned.

New subscribing members since the last annual meeting are :—His Honour Judge Woodcock, K.C., of Lypiatt Park, Stroud ; Mr. Ernest Wiper of Vancouver, B.C. ; Mr. George Hawkings of Cressy House, Goldhawk Road, London ; and Mr. R. J. Dyson of Overcourt, Bisley, Stroud.

Sir Frederick W. Moore, F.L.S., of Rathfarnham, Co. Dublin, has been elected an honorary member and has accepted the honour with thanks.

The natural history of *Cystopteris alpina*, Desvaux, has been somewhat extensively discussed in the "Gazette," and, through the efforts of several members and friends, of whom Dr. Rowlands was the most energetic, the true alpine type has been restored to cultivation in this country from which it had, apparently, been missing for many years. I have raised a crop of seedlings from a plant found wild in Switzerland and introduced by Mr. T. E. Waltham of London, and these have been distributed to the members apparently most interested. I shall be glad to send plants to any other members who may wish for it and who are willing to pay the small expense of postage, &c. It is still an open question whether the species can be considered a true native of Britain, inasmuch as there is still some doubt (i) whether the true plant ever grew here, and (ii) whether, if true, the plants found were indigenous or introduced. I hope to have the opportunity, before long, of examining some of the specimens upon which the reputation of the fern, as a British plant, mainly rests. Not many finds of varieties have been recorded during the year—the only one of which I have any knowledge being a very fine serrate form of *Scol. v. crispum* found in South Dorset last year by Dr. T. Stansfield. Specimens of a very curious, but not beautiful, cornute form of *Polypodium vulgare* were sent from Wisley to our president, but I have no information whether the plant was found wild or appeared under cultivation. Probably it was a wild find. (Fronds exhibited).

The Hon. Treasurer, Mr. J. J. Sheldon read his report, to wit :—

BALANCE SHEET.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance from last year	48	13	10	Affiliation Fee to R.H.S.	2	2	0
Subscriptions ...	53	15	3	"Gazette," Dec., 1929	15	2	9
Sale of "Gazettes"	1	2	0	June, 1930	15	9	3
Advertisements ...	2	2	0	Certificates of Merit (printing)	9	7	6
				Other Printing ...		13	3
				Expenses at Annual Meeting	4	17	0
				Postages & Sundries	2	16	2
				Balance at Bank ...	55	5	2
	£105	13	1		£105	13	1

Audited and found correct, September 1st, 1930.

(Signed) PERCY GREENFIELD.

It was proposed by Mr. Blow, seconded by Mr. Sinclair and carried, that the Secretary's and Treasurer's reports be received and adopted.

The President was re-elected on the proposition of Mr. Blow, seconded by Revd. Canon Kingsmill Moore.

The remaining Officers and Committee were mostly re-elected with slight changes, the complete list being as appended :—

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. T. B. Blow
Mr. Alex Cowan
Mr. T. E. Henwood
Revd. Canon Hawkins
Rev. Canon Kingsmill Moore
Mr. J. J. Smithies
Mr. G. E. Stephens

Hon. Treasurer :

Mr. J. J. Sheldon.

Hon. Secretary and Editor of The Gazette :

Dr. F. W. Stansfield.

Hon. Auditor :

Mr. P. Greenfield.

Committee :

Mr. Robert Bolton
Mr. Thomas Brown
Mr. P. Greenfield
Mr. A. J. MacSelf
Revd. E. A. Elliot
Dr. S. P. Rowlands
Dr. T. Stansfield
Mr. A. J. Sinclair
Mr. F. W. Thorrington
Mr. R. Whiteside

New members elected were :—Mr. H. Stinchcombe of Foleshill, Coventry and Miss Jessie Stansfield of Sale, Nr. Manchester.

A letter was read from Mr. A. J. MacSelf (who was unable to be present through ill-health) suggesting that the next annual meeting should be held at Southport during the time of the Show there. It was proposed by Mr. T. B. Blow, seconded by Mr. R. Bolton, and carried, that the meeting should be held at Southport on the second day of the Show, the members afterwards passing on to Whitewells, Trough of Bowland, N.W. Yorks, for the succeeding excursions, this locality being thought to be a new and promising one for fern hunting.

Mr. Alex. Cowan sent a large packet of fronds for exhibition, mostly varieties of *Lastrea montana* and including *L. m. plumosa*, Barnes, *plumosa*, Stansfield, *plumosa-cristata*, Whitwell, *incisa*, Barnes, *curvata* and *corymbifera*, Garnett. Also *Athyrium f. f. plumosum divaricatum* and *Lastrea filix-mas incisa*, Barnes (the last a grand frond, 4 feet long) and other fine things.

Canon H. Kingsmill Moore exhibited a number of seedlings of the *plumoso-divisilobe* strain of *P. angulare*. He was awarded certificates for :—

(i) *P. ang. tripinnatum grande*, Kingsmill Moore, a very fine falcate-plumose *tripinnatum* of large size.

(ii) *P. ang. acutilobum polydactylum*, K. Moore, of more robust habit than usual and of very symmetrical form.

Mr. Sheldon exhibited some seedling *Scolopendriums* and was awarded certificates for :—

(i) *Scol. v. crispum fimbriatum sagittatum*, Sheldon.

(ii) *Scol. v. lacerato-fimbriatum*, Sheldon.

Mr. Lovelady exhibited *A. f. f. plumoso-cristatum*, Lovelady, a cross between *A. f. f. plumosum*, Horsfall, and *regale*, Barnes. A certificate was awarded for this.

Dr. F. W. Stansfield exhibited :—

(i) *P. angulare acutilobum macrodon*, T. Stansfield, wild find in South Dorset in 1926.

(ii) *P. a. acutilobum divisum*, F.W.S., wild find at Tenby in 1927.

Both these were awarded certificates. He also exhibited a fine frond of *Athyrium f. f. fimbriato-cristatum*, Garnett, raised more than 30 years ago but still very rare.

Mr. Askew exhibited a number of seedling *Scolopendriums* and *Polystichums* including one said to be a cross between *P. angulare perserratum* and *P. a. grandiceps* but in which the *perserratum* character was not recognisable.

THE KENDAL MEETING—IN THE KENT VALLEY
SEPTEMBER 1ST, 1930

At a Committee Meeting held on September 2nd, Mr. W. Wilson of Kendal, one of the founders of the Society, was elected an honorary member. Mr. Wilson was present and exhibited a frond of a very fine *P. ang. plumosum* raised by himself from a sport raised by the late Mr. George Whitwell from *P. a. divisilobum plumosum*, Jones.

During the week or so that the party was in the neighbourhood of Kendal, excursions were made to Long Sleddale, Kentmere, Langdale, &c., but no variety of importance was found, although a number of interesting species was noted. *Lastrea montana* and *Allosorus crispus* were the prevailing ferns ; *Blechnum* was less abundant than we expected and *Polystichum aculeatum* (not *angulare*) was found occasionally as a rarity. The rare fern ally *Lycopodium selaginoides* was noted in Kentmere, and *Lastrea rigida* and *Polypodium Robertianum* were abundant on the limestone of Farleton Knott.

A visit was paid to the interesting garden of our past president, Mr. J. J. Smithies of Kendal, where many valuable ferns were seen including several kinds almost lost to general cultivation but still flourishing in the genial air of Westmorland under the care of our veteran member and friend.

A visit was also made to the interesting and picturesque rock-garden of Mr. C. H. Hough, M.R.C.S., of Ambleside, and also, incidentally, several members made the acquaintance of Mr. Wm. Purdom, the father of the late W. Purdom who accompanied the late Reginald Farrer on his journeys through China and Thibet and who is frequently and affectionately referred to, under the name of " Bill," by that picturesque writer.

MR. HENWOOD'S FERNS.

Fern-loving visitors to Reading have, this year, been more than ordinarily gratified by the sight of the collection of our veteran member, Mr. T. E. Henwood. Although our friend has only a small garden it is crowded with ferns of the best varieties, all cultivated to the highest pitch of excellence by the use of the best procurable soils and fertilizers and the unstinted application of skill, time and energy to the fight against climatic difficulties and insect and other enemies.

The small enclosure is primarily a fern garden, but the walls are mostly covered with climbing roses and ornamental ivies, &c., which are not only beautiful in themselves but form a fine background for the ferns as well as serving, in many cases, to shade them from strong sunshine and to shelter them from cutting winds. The gardens of neighbouring houses contain many trees, some of large size, whose roots invade the fern beds robbing them of both nutriment and moisture. In several cases the ferns are actually growing close to the stems and over the roots of large rose trees. Mr. Henwood has, however, seen ferns growing wild in hedgerows and woods and knows that their roots are able to compete even with the roots of trees, provided they are supplied with sufficient moisture. It is no small task to supply this artificially in the dry weather which we frequently experience here during the spring and summer months. The work is, however, successfully accomplished with the help of garden hose by which water can be conducted to any part of the garden and to any extent.

To come now to the ferns themselves. There are large specimens of *Polystichums*, both *angulare* and *aculeatum*, in their most beautiful varieties. The *angulares* comprise all the best *plumose divisilobes* including *laxum*, *densum*, *robustum* and *Baldwinii* of the Jones-Fox strain, besides *Grimmondiæ* and Esplan's form as well as many beautiful seedlings which have been raised from them. There are also numerous wild finds of the *acutilobe* and *divisilobe* section. The King of all, for this year at all events, is *divisilobum*, Bland, which is shown in our frontispiece of this issue. Others are *laciniare*, Moly, and *acutilobum*, Hartley, Dr. T. Stansfield's *acutilobum macrodon*, the Howley *acutilobe*, &c. This last is growing close to the stem of a large tree of *Rose Madame Alfred Carriere*. Both rose and fern seem to enjoy the association. Near to the Bland *Polystichum* is the plant of *P. ang. divisilobum plumosum foliosum*, H.S., which is not only a fine thing in itself but possesses the faculty of producing from its spores the most wonderful seedlings. We believe that practically all the *pulcherrimums* which have been raised under cultivation have come from this source. There is also a very fine plant of *Grimmondiæ*, 6 feet in diameter, but neither of these is seen in the photograph. Of *aculeatums* there is *pulcherrimum*, Bevis, the wild find from which all the best *aculeatums* have been raised, most of which are here seen in grand form, viz., *plumosum*, Green, *pulcherrimum*, Druery, and a host of the beautiful *gracillimums* raised by Druery, Green, Cranfield, &c., and which still continue to be produced when a sowing is made from *pulcherrimum*, Bevis. Of *Scolopendriums* there are some twenty different types of *crispum* including *speciosum*, Moly, *grande*, Wills, *splendens* Moly, *fimbriatum*, Stansfield, *nobile*, Bolton, the Roundstone and Mrs. Stabler's form, all of the best and in splendid character. Of *Athyriums* the most conspicuous is a grand specimen of the original *Clarissima* with 4 feet fronds, a perfect shuttlecock ; close alongside is a fine plant of the original *Victoriæ* which, like the original *Clarissima*, is not equalled by any of its offspring, fine as many of these undoubtedly are. Another near neighbour is *A. f.f. plumosum percristatum*, Druery, still probably the finest example of the combination of the plumose and crested characters in this species.

In a small house is a grand plant of *A. f.f. kalothrix* with faultless silky fronds just now yellowing towards autumn. The same house encloses what is generally considered to be the greatest " eye-opener " in the garden, viz., the collection of Polypodies of which almost every known form is grown, and certainly all the best. The King of these is *plumosum* Whilharris, of which an illustration was given in No. 5, Vol.

V., of the "Gazette." The development there shown, however, has been surpassed in recent years and we consider it the finest thing in Polypodies ever seen. It may be described as a condensed *Cambricum* of large size, robust habit, and solid texture. Its nearest rival we consider to be *Cambricum Barrowii,* which here also grows to the highest pitch of perfection. Next come *Prestonii* and *Hadwinii,* both most lovely things but lacking the robustness and solidity of Whilharris. Other fine things, magnificently developed, are *P. v. omnilacerum superbum* (the "Oxford" variety); *P. semilacerum falcatum,* O'Kelly, with bluntly lobed upward curving pinnæ; *P. v. pulcherrimum,* Atkinson, with fronds 9 inches wide, and its derivative *pulcherrimum densum* of Perry, and the sport from *Hadwinii* which so oddly mimics it; *bipinnatum,* Bell, and *bipinnatum,* F.W.S. Of crested forms, besides the ordinary *cristatums,* the three *grandiceps* forms of Parker, Fox and Forster, all much less known than they deserve to be and all quite distinct, are seen here in their highest development. Most exotic-looking of all is *P. v. Cornubiense* which has quite lost the ordinary pinnate character of the species and assumed the cutting and outline of the Killarney fern. Lastly there are the three Canadian forms or sub-species which, though not British, are as hardy as any *vulgare* and have a luxuriance of habit which render them peculiarly suitable for basket ferns. (They are referred to on p. 81, Vol. V., of the "Gazette.") Close to the Polypody house is a frame for *Blechnums* in which just now the most striking plant is a magnificent seedling raised by Mr. Sheldon from Mr. C. Henwood's *B. s. serratum.* It is a foliose *bipinnatum* with fronds 2 to 3 inches *in width,* the divisions of the pinnæ rounded and overlapping in the barren fronds but more acute in the fertile ones. It is perhaps no more than a vigorous development of the parent in the exuberance of youth, but it is certainly the finest grown and one of the most striking *Blechnums* we have ever seen. There is still another unheated greenhouse, one side of which is devoted mainly to *Aspleniums.* These are not so fine as in years past since the collection was severely punished by the severe winter of two years ago, but the plants are slowly recovering and there are good examples of *A. trichomanes incisum, Clementii, bipinnatum, confluens, cristatum*, &c. The other side of the house contains *P. aculeatum gracillimum* in several forms, a hybrid *Polystichum acrostichoides*, *A. f.f. acrocladon densum* and *unco-glomeratum*, *setigerum percristatum*, *Lastrea montana plumosa* in grand form and some large *Adiantums*, &c. Although there are at least three other fairly good collections of ferns in Reading, visitors are generally most impressed by Mr. Henwood's plants and never fail to exclaim in admiration on seeing his Polypodies.

CYSTOPTERIS ALPINA—DESVAUX.

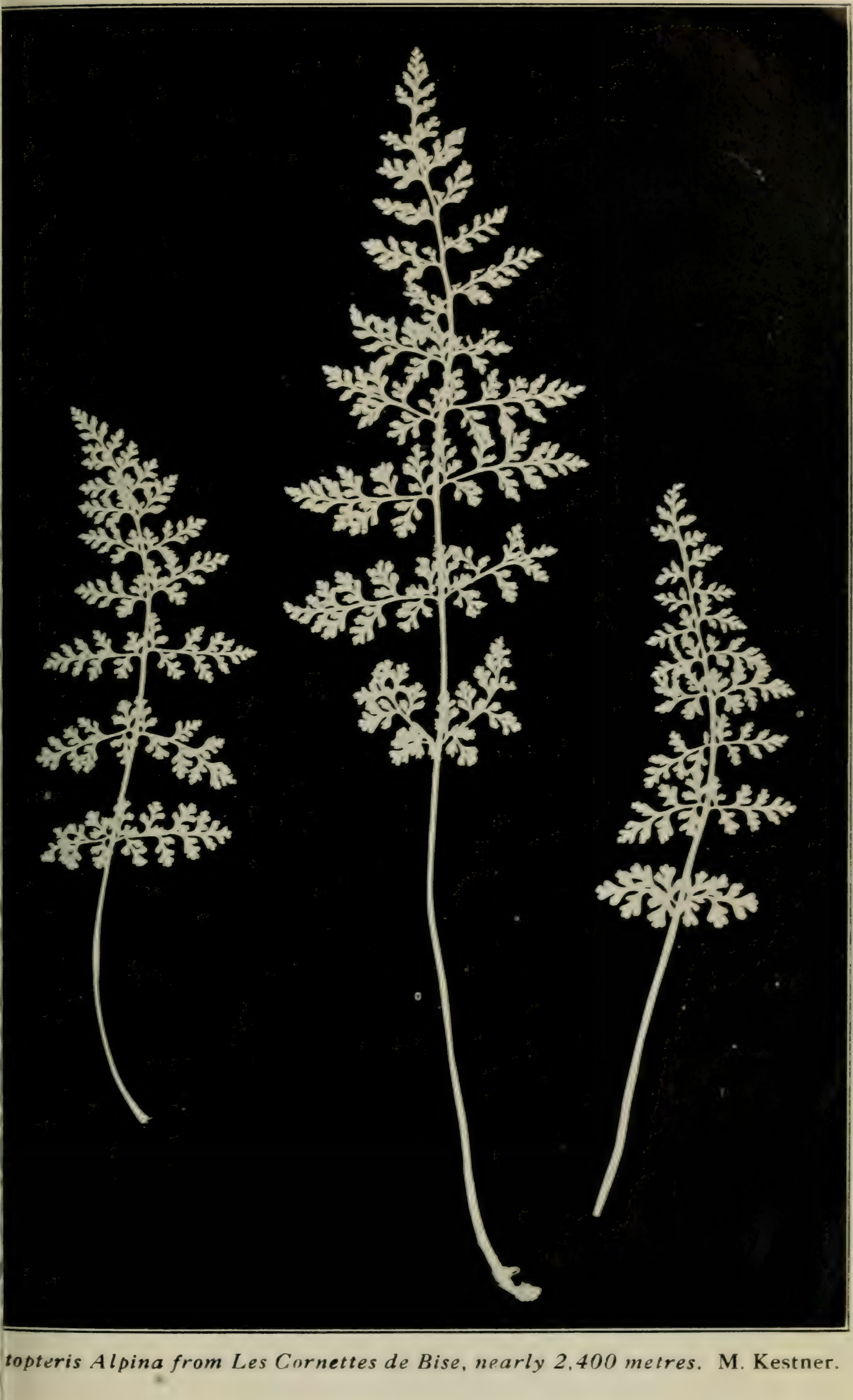
Following up the discussion on this interesting and rather mysterious fern, I have made a pilgrimage to Edinburgh in order to examine the late James Backhouse's Teesdale specimens. I was materially assisted in this by the kind help of our late president, Mr. Alexander Cowan, who met me at the railway station, drove me directly to the Botanical Gardens and introduced me to the keeper of the herbarium when the specimens were promptly produced for my inspection. The result of this examination leaves no doubt in my mind that Mr. Backhouse's fern was the true *alpina*, which must be acknowledged as a British fern on the strength of this record, whatever may be thought of the Low Layton fern which constitutes its first and best known claim to rank as a native of this country.

I was fortunate in finding also in the Edinburgh herbarium specimens of this Low Layton plant, authenticated by the signature of Sir William J. Hooker. While, by a stretch of generosity this plant may be regarded as possibly coming into the domain of aggregate *alpina* or "*regia*," it is a very different thing from the Teesdale plant and from the forma *dissecta* with which the latter practically coincides. Instead of being tripinnate it is bipinnate. The ultimate segments are not linear, and though they are slightly notched, the notches are not open and the venules do not, in many cases, terminate in the notches but in the pointed apices. I imagine it to be similar to the intermediate form into which M. Kestner says some of his plants degenerate when removed to a lower altitude. The forma *dissecta*, however, retains all its alpine characters in Reading as do also its seedlings of which I have raised probably some hundreds. Personally, I should like to restrict the title of true *alpina* to those plants which are not only *alpina* at 2,000 metres or more but can bear transplantation to the lowlands without changing into something different. Such is the forma *dissecta*. Dr. Rowlands writes me that he has recently visited the present Mr. James Backhouse, F.L.S., who was with his late father when the latter found *C. alpina* in Teesdale, and that the habitat was on Cronkley Fells and NOT on Falcon Clints as Dr. Rowlands had been informed. It was therefore a Yorkshire and not a Durham plant. It is interesting to note that Cronkley Fells are mostly of limestone formation and therefore more likely to be the habitat of *C. alpina* than the basaltic formation of the Durham side of the river.

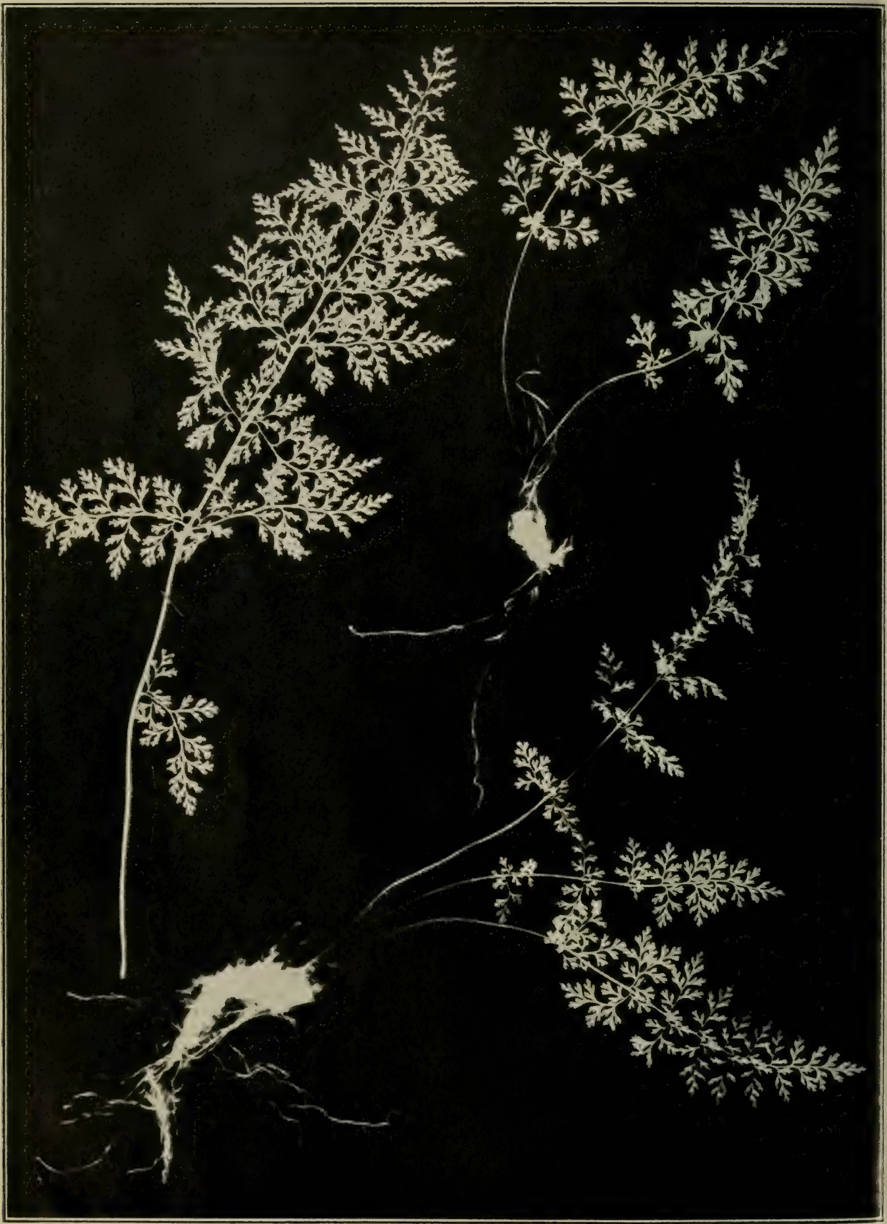
F.W.S.

CYSTOPTERIS ALPINA.

Referring to recent discussion in the "Gazette" on the specific characters and variations of *C. alpina*, M. Kestner has written to us, just as we go to press, enclosing some excellent prints of fronds. One is of specimens collected by him at Les Cornettes de Bise where he found this species plentiful, in company with *L. rigida*, at a height of 2,400 metres not far from the summit. In that locality he says *C. alpina* is very common, filling every crack in the rocks as *Asp. Ruta-muraria* will fill the chinks in old walls, the specimens being mostly very small except for larger ones at the foot of rocks in less exposed places. On his return from the hunt our correspondent was faced by some difficult and dangerous mountaineering, in the course of which the finest specimens collected



topteris Alpina from Les Cornettes de Bise, nearly 2,400 metres. M. Kestner.



Cystopteris Alpina from above Les Plans, about 1900 metres. M. Kestner.

were unfortunately lost. He therefore obtained some prints from specimens in the Lausanne University herbarium which he considers fair samples of the fern as found in quantity on calcareous mountains at a sufficient altitude. Other prints are of fronds from the mountains above Les Plans, near Bex, at about 1,900 metres which, M. Kestner points out, are more slender than those from the higher altitude.

M. Kestner also informs us that out of 100 specimens of *C. alpina* in the Lausanne University herbarium only two are from habitats alleged to be non-calcareous, a doubtful allegation even in the two cases, as calcareous outcrops are known to occur here and there in non-calcareous mountains. *C. regia*, on the other hand, is described by Christ (" Die Farnkraüter der Schweiz ") as having no preference for any kind of stone. *C. regia* is a very indefinite and variable intermediate between *fragilis* and *alpina*, whereas *C. alpina* is very definite both in characters and in habitat. We have, therefore, M. Kestner concludes, every reason to consider *C. alpina* as the type and the various *C. regia* as sub-species of *C. fragilis* or low altitude forms of *C. alpina*.

F.W.S.

CETERACH OFFICINARUM.

The purpose of this article may best be introduced by two contrasting statements. One, that the London catalogue (1908) gives 68 as the number of vice-counties in which Ceterach occurs : this figure making it of at least frequent character, slightly more common than *Polystichum angulare*, definitely more so than *Cryptogramme crispa*. Two, that in " The Ferns of Wales," published in 1856, Edward Young remarked " a species peculiar for being rarely found in its native habitats, but on old walls and ruins."

What are its " native habitats " ? Perhaps they are usually taken to be the old walls and ruins, where, as Mr. Druery wrote, it is " found sometimes in great profusion."

My argument is (1) that were it not for such stations, *Ceterach* would be a very rare fern, (2) that it is NOT there because old walls resemble its natural haunts.

(1) Lowe does not even mention localities on rocks and cliffs, specifically, but says simply " growing on walls and ruins " and " growing wild they are seldom found except on the south or sunny side of a wall." Also, that the finest plants he ever saw were in " a close heavy clayey soil," in a northern sunless spot.

Britten (European Ferns) goes rather against this last remark by saying that the fern should be in " not too damp a situation." Shirley Hibberd demanded *perfect drainage* for it.

Britten says that it is " found in nearly all southern, northern and western counties, but is comparatively unfrequent in the eastern and midland counties. Its home would seem to be in the west." And, unlike Lowe, he tells us that (in Ireland) it grows on calcareous rocks and walls : there it is frequently abundant.

Moore (octavo edition) besides a long list of localities that are obviously wall-stations, names rocks in Yorkshire, cliffs in the Lake District, granite near Dublin, marble quarries at Kilkenny, and clay slate in two Irish places. He also records the limestone cliffs of Dovedale, where, by the way, it has recently been found again after supposed extinction. He says of it : " grows usually on walls and ruins, less frequently on calcareous rocks, and rarely epiphytal " ; giving a Hampshire instance in the latter case.

Smith (Ferns of Derbyshire) calls it " a domestic species " and states that it is (in 1877) found in crevices of rocks and old walls, on limestone soils.

Druery says : " A lover of the sunny side of ancient walls, where it revels on old mortar pure and simple."

There are directly conflicting opinions expressed by these authorities on one point in cultivation, that is, moisture. One favours much, drainage immaterial, another much, drainage vital, another practical drought. The question of *soil* in this case need not concern us, as it is well known that the natural soil of a wild plant is often better avoided when it is transferred to cultivation.

Now, is it really a rare fern ? Hooker, in 1835, does not enumerate localities, but says : "rocks and walls, *most abundant in limestone countries*." He, and Young, twenty years later, wrote before the vandal's day. Smith, in another twenty years, was clearly suffering from the effects of that devastating period : "Dovedale is already stripped to the bare rock of its ferns." But even he does not claim that *Ceterach* was ever common in Derbyshire's limestone. So Hooker's statement seems to be not more than a comparative one.

From all this it is fair to deduce that *Ceterach* owes its reputation of ubiquity to its choice of an artificial home. It would be interesting to know how many botanists have seen it anywhere but on a wall.

(2) Why does it grow there so abundantly ? Here we are faced with an ecological problem ; one of the points of fern study suggested by Dr. Rowlands in the last "Gazette," as likely to give us a good deal of work to do.

Well, before going any further, it may be taken reasonably, as a proof of rarity, that *Ceterach* is abundant on walls. For that fact shows that it is not a shy grower : the vandal, with all his destructive ways, has not extirpated it thence : and so it can never have grown profusely elsewhere or there would be far more trace of it than there is.

One hesitates to proceed and to go against the usual opinion, expressed in the quotation already made from Druery's "British Ferns." But is *Ceterach* on walls because of the lime they contain ?

Remember, it has been found on granite, clay, slate and marble. And here, where this article is written, where limestone plants such as *A. trichomanes* and *ruta-muraria* are common in cliffs as well as old walls, no sign of *Ceterach* on the latter is to be seen. If it is truly a limestone plant, one would have expected (a) to find it common in such soil, as one does with the two *Asplenia* mentioned, (b) spreading rampantly on to walls, just as they have done.

Instead, it is most abundant, in its selected home, where there is not a purely limestone soil.

The conclusion from this seems at least justified, that it grows where it does, and is plentiful there, because it likes a mild climate better than any other : can find a small amount of soil, nature more or less immaterial, in crevices : and is assured of perfect drainage though also of abundant moisture. Only these three desiderata are all found together in the south and west and in Ireland : and that is just where *Ceterach* abounds.

E. A. ELLIOT.

[It is obvious that *Ceterach* must have grown somewhere before any walls were built and it is to be presumed that it migrated to these congenial situations as they came into existence. It grows plentifully on limestone rocks in the West of Ireland where it is undoubtedly native. We have never found this fern growing abundantly except in a limestone district, and the walls inhabited by it have been either built of limestone or mortared. It is well known that many lime-loving plants stray into other geological formations, where they live, at all events, for a time. It is also recognized that *Ceterach* and other lime lovers (including even those special habitués of limestone, *Dryopteris* (*Lastrea*) *rigida* and *Polypodium calcareum* can be successfully cultivated, for a time, in soils that contain no appreciable lime. *Ceterach* undoubtedly prefers a mild and moist climate such as that of the South-West of England and Ireland, but Newman records it as occurring in three Scottish counties including Perthshire. In 1928 we found it growing sparingly among the melting snow (in June) at about 6,000 feet in Switzerland. There were no walls here and the rocks were certainly not limestone, though they, or the soil, may have contained some calcareous constituent.—*Ed.*]

ON FERNS IN DERBYSHIRE.

There is a dale, between Bakewell and Tideswell, which is famous as the home of a very rare moss : and in August last year I spent six hours there one day in search of this species. The first five were taken up with the attempt to find the correct habitat, leaving only one hour in which to hunt for the moss itself, and this proved insufficiently long.

But a good deal else turned up, beginning with a fair quantity of *Geranium sanguineum.* The whole dale is of limestone, and this showy plant was scattered about mostly on a dry slope. In the then dry bed of a stream below this slope was a quantity of *Hemp Agrimony*, which is very common in Devonshire hedge banks but which I never saw in Staffordshire during five years. Lower down this stream is overhung with bushes, and its banks are higher, and damp in summer ; here *Polystichum aculeatum* appeared in some abundance and size : also the only plant seen of *Lastrea dilatata*, a large clump. *Filix-mas* was frequent, but *filix-femina* much less so, all day.

On proceeding up the stream-bed, the banks grew rapidly lower until they almost vanished. The dale here becomes more open and down-like, with low rocky hillocks on each side. In the clefts of these *Cystopteris fragilis* and *Asplenium trichomanes* are innumerable, especially the former, with a good deal of *ruta-muraria.* The grassy slopes hereabouts were lit up with the little yellow Pansy, and provided the second surprise in the shape of Grass of Parnassus. This is more abundant further on again, in a small dale branching off the main valley.

On turning back down the other side of the dale some *Polypodium vulgare* was seen, and at the edge of a deep cleft (a dangerous place) on a hillside, one or two Hart's tongues were discovered, thin weedy-looking barren specimens. Just beyond this point a rough limestone scree of rather large stones was encountered, with what looked on approach like extra large *Cystopteris*. On reaching these they were found to be *Limestone Polypody*, with stipes wandering apparently feet deep and with roots going deeper still. Excavation seemed likely to be an endless affair, and was abandoned after considerable quarrying.

A little further on, on a ledge high up a small cliff, a cluster of Harebells of the usual vivid blue was made noticeable by containing a pure white varietal-flowered plant. So far no likely habitat for the moss had occurred, but later on when it was discovered, several more Hart's tongues were also seen. All of them were of the same thin texture in frond and those low enough to be examined were barren.

In the following October I had to fill up an hour, about twelve miles south-east of this dale. It was with no little surprise that I found the soil entirely different, as was proved by the discovery of several fine *Blechnums*, bearing fertile fronds, and a large number of clumps of *Lastrea oreopteris*. In this district, too, *Lastrea dilatata* is common and very vigorous in growth, but no *spinulosa* were to be seen : nor have I yet seen *Lastrea pseudo-mas*.

E. A. ELLIOT.

VARIETAL TYPES OF BRITISH FERNS—*continued.*

By Mr. CHAS. T. DRUERY, F.L.S., V.M.H.

(*Read at the Meeting of the British Pteridological Society, at Bowness, Windermere, August 3rd,* 1903.)

This paper is already long enough, though, knowing as I do the multiplicity of types and subtypes in existence, I feel that I have only touched the fringe of the subject, which another paper of even greater length could not exhaust. Obviously, however, in view of the wealth of good material, it behoves the Society in these days to be very strict in the awards of merit which it contemplates giving to new things. The keynote has been struck in our Book as regards symmetry and thoroughbredness, if I may use such a word, and all examples which do not ring in accord with this note should be gently and courteously put out of court.

On reperusal I find I have omitted to refer to the *pulcherrimum* type as exemplified in *Polystichum angulare,* except indirectly with reference to apospory, an omission which I hasten to rectify, as it is really an important one ; since despite the unfortunately generally fugitive character of this form of variation, it is one of the most interesting of all. In the *Polystichums,* it appears in the shape of a considerable lengthening of the pinnules, especially the lower ones, into long slender falcate ones, the apices of which grow out into prothalli. All the several finds, with the exception of Moly's unique variegated one, have a strong tendency to revert to the normal and unfortunately the plants resulting from the prothalli are invariably either very depauperate, or in the single exception known to me relating to Moly's *variegatum,* very much weaker in constitution when true to type. *A. f.f. Clarissima* Bolton would appear to be really the *pulcherrimum* type of *Athyrium,* having the same tendency to revert and produce imperfect offspring. One plant I raised appeared to be a thoroughbred fixed one, growing to full size and shewing true character throughout for two seasons. Eventually, however, it began to throw normal and partly normal fronds and this year is an absolutely normal fern. *Scol. v. Drummondiæ* undoubtedly is the same type in that species and produces very mixed progeny, many of which are typical or improved. I am informed by Dr. Stansfield that a number of decomposite *Polystichums* raised in the Sale Nursery have presented the same aposporous character when young, but they invariably grow out of it. Mr. Garnett's aposporous *A. f.f.* also yields imperfect weaklings from its fringes, at any rate, so far I have failed to raise a typical plant of any size. Cropper's fimbriate *Lastrea,* however, though itself " miffy," seems capable of producing its type exactly without exception. The moral of this addendum is that whenever we find a variety tending to special slenderness of its ultimate divisions, we may suspect a tendency also to aposporous reproduction, with which it is correlated in all cases so far discovered.

I should also refer to the *revolvens* type of variation, characterizing as it does wild finds in several species. In this the normally flat frond is convexly curved so that the pinnæ roll backwards and form the frond into a sort of a tube. This is correlated with a spiral twist of the terminals presumably induced by the tendency of the upper surfaces to keep towards the light. The best form I think is my own *A. f.f. revolvens,* in which the pinnæ and frond tips curl ringlet fashion. *L. filixmas revolvens* is another one with a slight tendency to reversion and I have found *Blechnum spicant* distinctly varied on similar lines. There are also several *revolvens Polystichums.*

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

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Hon. Treasurer : Mr. J. J. Sheldon, F.L.S., "Monkhams," Lower Road, Great Bookham, Surrey.

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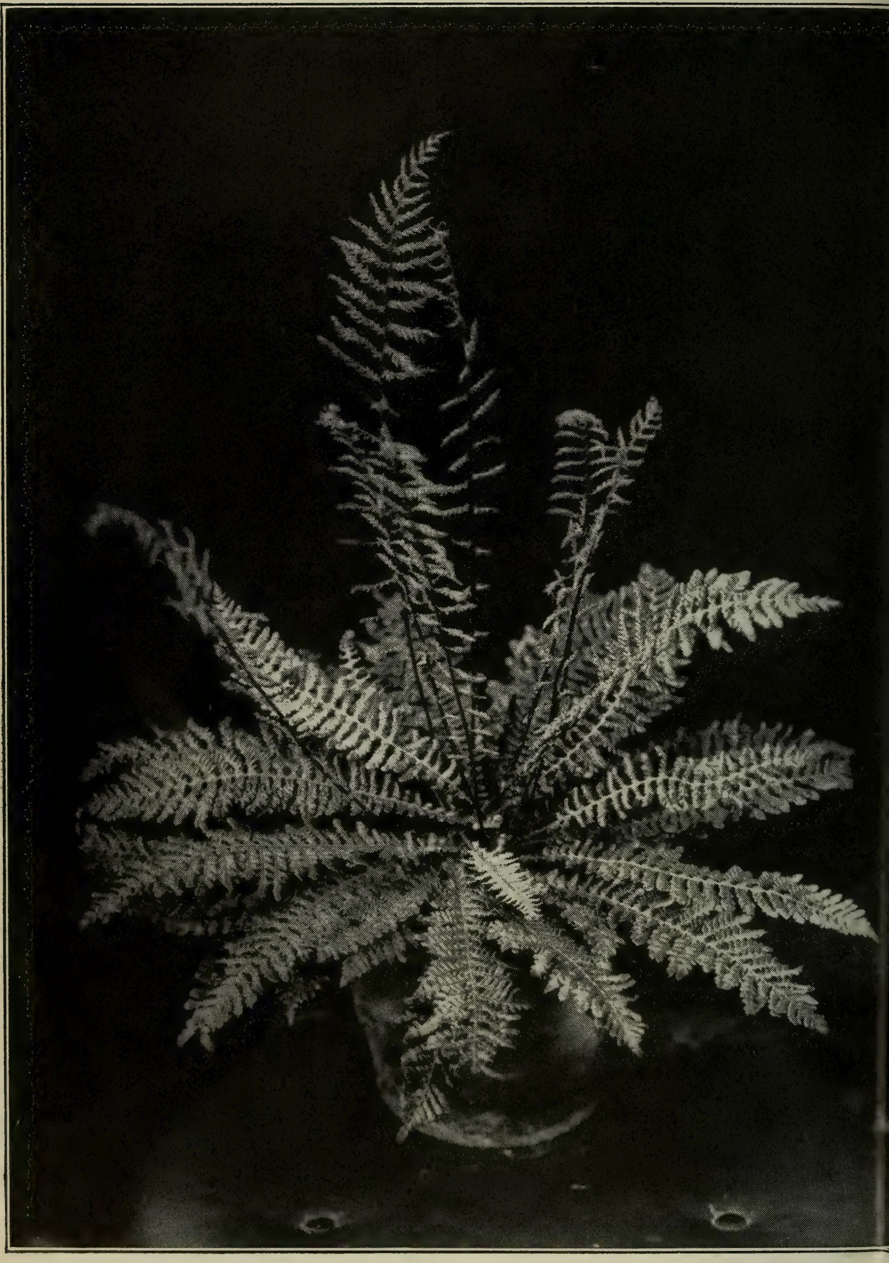

Blechnum spicant bipinnatum, Sheldon.

THE
BRITISH FERN GAZETTE.
NEW SERIES.

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OUR FRONTISPIECE.

Blechnum spicant bipinnatum, Sheldon.

The figure is from a photograph, taken in 1930, of a plant in the collection of Mr. T. E. Henwood and raised by Mr. Sheldon from the *B. s. serratum* found by Mr. C. Henwood at Chenies, Bucks, in 1916 (GAZETTE, Vol. IV., p. 6). The original plant (i.e., the parent of this) is very similar to *B. s. serratum*, Airey No. 2, but the seedling shows the same characters in a more pronounced form, being more thoroughly bipinnate and also more constantly characteristic than the parent. It is probable that tripinnate forms may be raised from this source as in the case of Airey's plant, e.g., *serratum*, Airey No. 1, which Mr. Druery ventured to call *plumosum* and figured under that name in his "British Ferns and their varieties." Mr. Smithies raised, from Airey's No. 2, a form very similar to Mr. Sheldon's *bipinnatum*.

EDITORIAL NOTES.

Our present issue contains notes of a somewhat elaborate series of observations made upon the scales of some of the British species of *Dryopteris* (section *Lastrea*) by our member, the Rev. E. A. Elliot of Longstone. They are important and valuable inasmuch as the scales of ferns often present distinctive features by which the species may be recognised when many of the principal parts of the fronds are absent or undeveloped (c.f. "*Lastrea dilatata* and its allies," GAZETTE, Vol. III., p. 104, etc.). The series does not include *L. thelypteris* but probably this distinct species will be worked up in a later communication. Also we may be able to trace out the connection of the *Lastreas* proper, through *montana*, with the subgenus *Phegopteris*, the species of which are included, with *Lastrea*, in the genus *Dryopteris* by modern botanists.

A recent important accession to the ranks of the Society is Dr. F. E. Weiss, F.R.S., Emeritus Professor of Botany in the Victoria University, Manchester. The Professor is anxious to obtain, if possible, a complete set of the BRITISH FERN GAZETTE for which he is willing to pay. Unfortunately we are only able to supply him with an incomplete set, Nos. 2, 5 and 7 of Vol. I., Nos. 13, 19, 21, 23 and 24 of Vol. II., and Nos. 4 and 6 of Vol. V. being out of print, while of several others only one or two copies remain. Any members who may have copies of the missing numbers to spare will oblige the Editor by sending them to him and he will pay for them one shilling per number plus cost of postage. Professor Weiss was recently elected President of the Linnean Society of London. Another new member of our Society is Mr. A. H. G. Alston, B.A., F.L.S., Assistant Keeper of the Dept. of Botany, British Museum of Natural History, Cromwell Road, London, S.W.7, who also desires a complete set of the GAZETTE for the use of the Museum. The complete series has been supplied to the literary department of the British Museum, in accordance with the law of copyright, but the Natural History Museum is a separate building and entity from the Bloomsbury one. Mr. Alston also wishes to obtain for the Museum a series of dried specimens (i.e., fronds) of all the species and the more important varieties of British ferns. As it is very important to the cult that a standard and representative set of specimens should be available for reference it is hoped that many members will be willing to assist in presenting a series to a national museum. The question will be discussed at length at the coming meeting of the Society and the Editor will be glad to hear from any members who are able and willing to contribute to the series.

Our esteemed Hon. Treasurer, Mr. J. J. Sheldon, has been elected a Fellow of the Linnean Society, an honour upon which we congratulate him.

THE ANNUAL MEETING.

The Annual Meeting of the Society will, this year, be held at 10 a.m. on August 27th, at the Prince of Wales Hotel, Lord Street, Southport, which will be the headquarters of the Society while the members are in the town. The manager of the hotel is Mr. H. Gascoigne. It is anticipated that many members will wish to visit the Southport Show and they will thus be enabled to " kill two birds with one stone." It is also hoped that fern-lovers who are non-members may be attracted to the meeting and may be led to join the ranks of the Society. The Southport Show is one of the most important horticultural events of the year and, in itself, will more than repay a visit from lovers of flowers, ferns and fruits of all kinds. As the country around Southport is not rich in wild ferns it is proposed, and arranged, that those members and friends who can spare the time shall afterwards move on to the Trough of Bowland, in the adjoining county of York, where ferns are abundant and where good hunting may reasonably be expected. The headquarters of the party will be the Whitewell Hotel (Proprietor, Mr. George Miller), situated on the banks of the river Hodder, a tributary of the Ribble, 9 miles from the railway stations of Clitheroe and Longridge and 18 miles from Preston and Lancaster. Visitors both to Southport and Whitewell are advised to secure accommodation in advance as otherwise this may not be available.

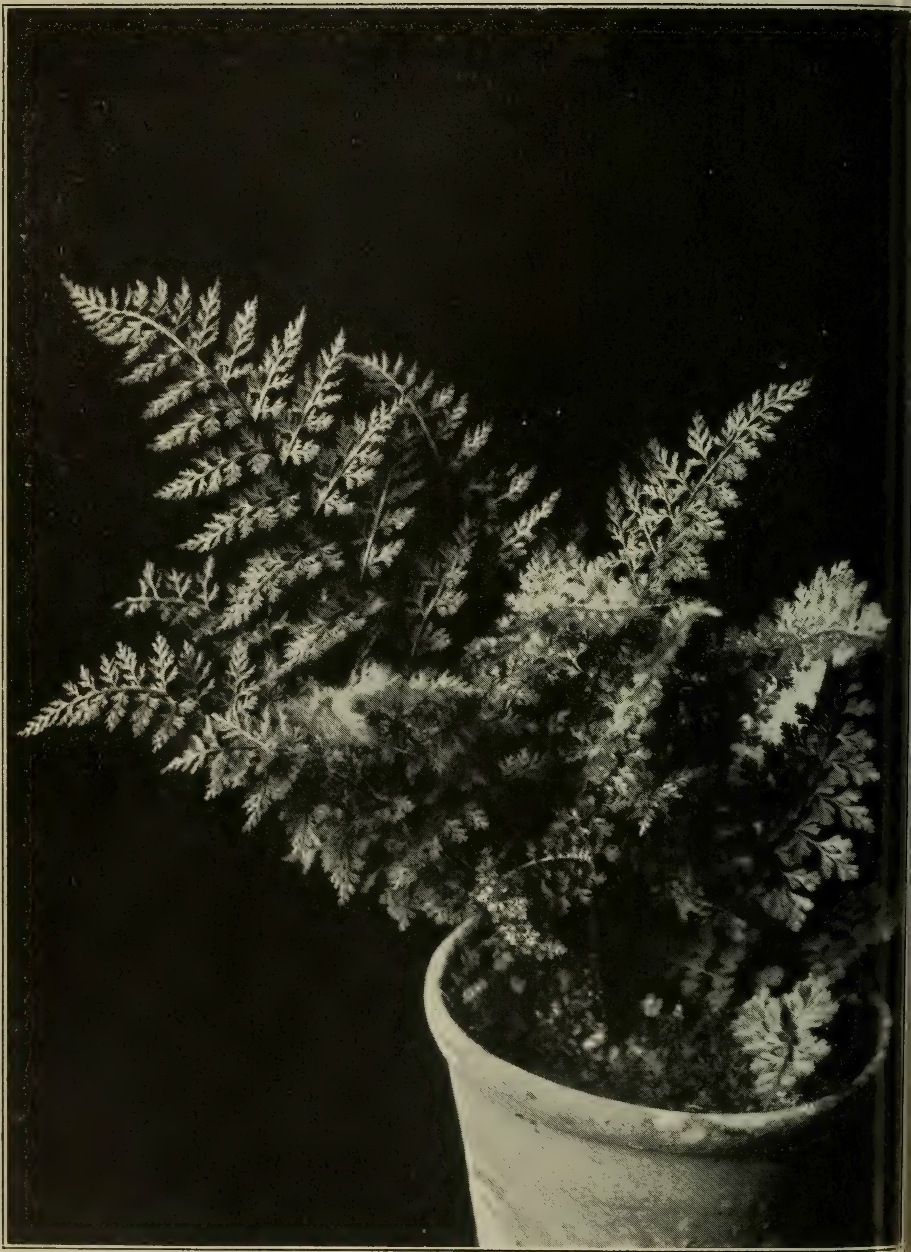
OBITUARY.

GOTT.

We have to record the death of another veteran fern-grower in the person of Mr. John Gott of Kendal who died on April 19th at the patriarchal age of 96 years. He was one of the founders of the Society, for many years a very active and energetic member, and his tall and erect figure was generally in evidence at the meetings and excursions in the north. He was the finder of several varieties, including a foliose and congested form of *Lastrea montana* (*L. m. crispatissima*) and a dentate form of *Asplenium trichomanes*. The Westmorland Gazette of April 25th relates that he occupied the same business premises for seventy years from 1859, attending regularly to business all the time, until 1929 when he retired into private life. It is stated that he maintained that the secret of his vigorous health and long life was the regular out-door exercise which he obtained in the pursuit of his hobby of fern-hunting. Mr. Gott was not alone among fern-hunters in the attainment of a ripe old age, the late Mrs. Frisell and Messrs. W. H. Phillips, George Whitwell and Joseph Wiper being other conspicuous examples of longevity. There are still several octogenarians among the members of the Society who are still active and enthusiastic. "Long may they wave." *Absit omen.*

SMITHIES.

Just before going to press we receive information of the death on June 8th of another veteran member of the Society, an octogenarian, a Vice-President, and a Past President, viz.,



Cystopteris alpina, Desvaux; *Forma dissecta*, Stansf.

Mr. James John Smithies of Kendal. Mr. Smithies joined the Society immediately after it was formed ; he was then living in the neighbourhood of Manchester. He was a most active member almost up to the time of his death, and many of the members had the pleasure of meeting him at the time of the last Annual Meeting. He was the finder of several good varieties, including two quite distinct forms of *Lastrea montana grandiceps*, the only ones ever found. He also found in Ireland a plant of *Asplenium trichomanes confluens* which, though differing slightly from the original Lake District form, shares with it the same biological and most of the same morphological characters. He was a man of sterling character, strict integrity, and great generosity—altogether a most likeable man. Almost his last words to the present writer last September were " You are my oldest friend." He retained his faculties, with the exception of an impaired memory for recent events, up to quite recently. A few months ago he underwent a somewhat severe surgical operation from which he recovered, but was never quite the same afterwards. He is survived by his widow and a comparatively young son and daughter, to all of whom we offer our most sincere sympathy.

CYSTOPTERIS ALPINA, DESVAUX.

We present herewith a figure of the *forma dissecta* of *C. alpina* taken from a recent photograph of the original plant sent to the Editor by Dr. Rowlands and collected by Mr. T. E. Waltham above Geneva in 1926. It will be seen that it retains, unimpaired, its finely dissected character after five years of cultivation in the lowlands. It also retains, without change, the botanical characters of *alpina* some of which (notably the venation) are only perceptible on close examination of the actual plant and cannot be seen in a reproduction, and only with difficulty in an actual photograph. This is the plant which the writer was " brought up " to call " the true *alpina*." There are, however, other forms which are botanically true *alpina*, but which have not the finely dissected character of this plant. The *forma obtusa* collected by M. Kestner in 1928 and sent here in the following winter has also preserved its character under cultivation without appreciable alteration. A plant of *alpina* collected by M. Kestner at 6,900 feet in 1930 is almost as finely cut as *dissecta*, but is more dense in frondage and more compact in habit. It also retains all the characteristics of true *alpina*.

EXPERIMENTS IN THE PROPAGATION FROM SPORES OF HYBRID FERNS.

Difficult breeders as hybrids are generally admitted to be, both in the animal and vegetable kingdoms, they are by no means universally sterile as is well known by raisers of roses, daffodils, orchids, Irises, Primulas, etc., as well as by breeders of dogs. The same thing is true with regard to ferns although attempts at raising from the spores of hybrid ferns have not been frequently successful. The late Mr. E. J. Lowe made a great number of sowings from *Dryopteris* (*Lastrea*) *remota*, A. Braun (generally believed to be a hybrid between *D. filix-mas* and *D. spinulosa*), but in every case without success. Nevertheless it is practically certain that spores of this fern once produced seedlings which came up, self-sown, upon the soil in the pot in which *remota* was growing. This was in the Todmorden nursery of the present writer's grandfather some sixty or more years ago. Although only a boy at the time I remember the circumstances vividly and I still have some of the plants in question. Only some six or seven plants came up, but these were all alike, and, though they differed slightly from the parent (being smaller in stature and with a slight tendency to depauperation) they bore more resemblance to it than to anything else and certainly could not be referred to any other species. I have myself made only two attempts to raise offspring from *remota*—the first time four or five years ago when a very sparse crop of *prothallia* appeared all of which turned out to be strays of other species, mostly *D. alpina fastigiata.* The second sowing was made in 1929 and again a very small crop came up, most of which were removed seriatim as soon as recognisable since they were all a well-known form of *filix-mas.* One plant, however, remains which resembles *remota* and may be that fern but is not yet sufficiently developed to be certainly determined.

Dryopteris uliginosa is believed, with good reason, to be a hybrid (*D. cristata* × *D. spinulosa*), and I made a sowing of it early in 1930. A very small crop of eight or nine plants resulted, all weakly deformed things, and they are still too puny to be recognised with any certainty. *D. cristata*, the nearest ally of *uliginosa*, was sown at the same time as the latter and came up like mustard—a very profuse crop in marked contrast with the sowing of *uliginosa.* Again *Asplenium lanceolatum microdon* was sown twice a few years ago and the result was in one case nothing, while in the other a very small crop of puny abortions was produced, none of which lived to adult life but the strongest of which looked like *Scolopendriums* of abnormal but indeterminate character. This feebleness of constitution and irregularity of outline seems to be characteristic of the offspring of hybrid ferns as it occurred in the seedlings from *remota* previously mentioned and also in a single seedling which I raised some years ago from spores of *Asplenium trichomanes confluens.* Also a hybrid *Ceterach* × *Phyllitis Scolopendrium* (E. J. Lowe) died after making a few fronds 1½ inches long. I saw the corpse soon after it gave up the ghost. *Asplenium Germanicum* is another fern which is accused of a hybrid origin, the late Mr. G. B. Wollaston including it without hesitation in his list of " natural hybrids " (*vide* GAZETTE, Vol. V., p. 130), while others hold it to be a distinct species. In the same list Mr. Wollaston mentions *Asplenium trichomanes confluens* which he there describes as *A. trichomanes* × *A. Adiantum-nigrum.* I believe however that he afterwards modified this view and agreed with E. J. Lowe who considered it to be *trichomanes* × *marinum*. Of course both views may be wrong and there is some evidence, not however quite conclusive, that the real parentage of this fern is *A. trichomanes* × *Phyllitis Scolopendrium* (GAZETTE, Vol. V., p. 215). In February, 1930, I sowed spores of *Asp. Germanicum* from a long-cultivated British specimen. A very thin and discrete crop of prothallia appeared and in the autumn of the same year two of them produced fronds and the plants now seem to be *Germanicum* though they are still small and feeble-looking. In December, 1930, another sowing was made from a wild plant of *Germanicum* kindly sent to me from Switzerland by M. Kestner. Since the spores from wild plants are generally more vigorous than those from cultivated specimens I was more hopeful of this sowing than of the former one. So far it has only produced a couple of very small prothallia, but it is still possible that others may appear later. As, however, the spores of other ferns, sown at the same time, have germinated normally the prospect of a crop of *Germanicum* seems rather remote, and the evidence, so far, seems rather to support, by implication, the theory of its hybrid origin. Further sowings will be made as soon as fresh spores are available. I am not aware that this "species" has been previously raised under cultivation although most of the other Alpine ferns have been so raised and I have myself raised, at various times, good crops of *A. septentrionale*, *A. fontanum*, *Woodsia alpina*, *W. ilvensis*, *Cystopteris alpina*, and *Polystichum lonchitis*.

F.W.S.

OUR HOBBY.

WHAT OF ITS FUTURE?

By A. J. MACSELF, Editor of *Amateur Gardening*.

If it is true—and surely few indeed would dispute it—that horticulture in all its phases is nourished upon unselfish principles, we, whose particular hobby is the study and cultivation of British ferns, may, without displaying unseemly egotism, claim credit for nourishing our hobby in full measure. It is characteristic of the pteridologist that he delights in welcoming all and sundry to view his collection of ferns, and great is his joy when he is able to take an offset from his most unique rarity to augment a friend's collection. It has, indeed, been frequently remarked that the chief reason hardy ferns are difficult to find in the average nursery is that they are not a profitable proposition simply because those who want ferns have gifts in plenty showered upon them by comrades of the cult.

Had the purpose of this article been to debate that contention no difficulty would be experienced in confronting our commercial friends with stubborn points of argument, but other thoughts have prompted this application of pen to paper ; thoughts concerning the future of our hobby, and which have a direct appeal to the characteristic unselfishness of the fraternity already alluded to in the opening paragraph.

Meditating for a moment upon the past, some of us are old enough to remember a period when good collections of hardy ferns were plentifully distributed through the gardens of the British Isles, and when the British Pteridological Society flourished with a membership strong in numbers as well as enthusiasm. It is common knowledge that since those days the cult of British ferns suffered a partial eclipse, collections were lost, connoisseurs slipped away, memberships of the Society lapsed, and other phases of horticulture progressed with rapid strides while pteridology languished.

To-day, once more, we may rejoice in the unmistakable evidence of a revival of interest in British ferns. New collections are being formed, information is sought with eager liveliness, membership of the Society is on the increase, and, altogether, prospects may be described as rosy. Nevertheless, it is not for us who witness and delight in this new found activity to sit back with complacent self-satisfaction. There is still, and, perhaps, to-day a greater call than ever upon the exercise of the unselfishness of which we boast.

The safety and welfare of the future of our hobby as well as its present rests very largely in the hands of this generation. It needs a greater and nobler unselfishness to work for those who are to follow us than for old acquaintances and close friends. We owe it, however, to posterity and to the ferns which are the object of our affections to do all that lies in our power to safeguard the future of the cult and of the Society which fosters its development and progress.

A very significant fact that cannot be ignored is that most of the best collections of ferns are owned by men of advanced age, and it is the veterans who not only possess the plants but also the knowledge of pteridology. However melancholy reference to the matter may be it is futile to ignore the fact that the time approaches when first one and then another will foresake the care of their ferns and take beyond human reach their store of knowledge.

Every prudent individual discharges as a duty the task of preparing instructions for disposal of possessions of an accepted market value, and every pteridologist should make such provision as will ensure the preservation and future safety of his ferns which may otherwise, for lack of such provision, be left to fade away or be subjected to wanton destruction by unappreciative hands. Horticulture in its various branches has suffered many such misfortunes in the past. How often have ferns of unique character and superb quality vanished from cultivation which might have passed by instruction to other collections or to public establishments where they would have been available for inspection and propagation ?

In regard to acquired knowledge it behoves every one, great and small, to make effort whilst he has the faculties for disbursing from his store.

Many of the members of this Society could tell something which would be helpful to inexperienced beginners in the study and cultivation of ferns, yet, though we have THE FERN GAZETTE published at recurring intervals it is time after time left far too much to our indefatiguable but over-worked Secretary-Editor to fill its pages. Those who know something —anything—however much they may cherish a bit of secret knowledge that may help others to grow better ferns, should get the information into print. Once published it will be a legacy to posterity.

The recent revival of interest in our hobby owes not a little to the introduction of the Hardy Fern Classes at Southport Show. It should be considered a moral obligation by all who profess to be enthusiasts to support that Show with some exhibits. No better means exist of bringing the beauties and claims to attention of British ferns before the notice of the rising generation, and it is young recruits we want, and must have, to fill the ranks of connoisseurs as time takes toll of the veterans.

Those who have influence with organizers of other shows should use that influence to secure the introduction of classes for hardy ferns. By these means may we safeguard the future of our hobby.

FERN SCALES UNDER THE MICROSCOPE.

Having acquired, at much the same time, a microscope and a special interest in the differences between *Lastreas dilatata*, *spinulosa* and *æmula*, investigation of their scales was begun. The result was so interesting that further species were tackled, and all the writer's fern-growing friends were pestered with begging letters for fronds. At the same time wild plants were brought under contribution as much as possible ; this appeared essential and of first importance, as a *Lastrea spinulosa* from my own fernery showed scale features not seen in any other plant of this species. However, on the whole, garden and wild plants do not differ ; of course, no two individuals, whatever their origin, are exactly alike.

The results obtained are offered as a possible, slight, and secondary help in fern identification. Plants of some age have been in all cases utilized, which in one way makes the results less useful than if young specimens, not easily recognizable, had been examined.

Two microscopic powers were used, one a $\frac{1}{2}$ inch and one a $\frac{1}{6}$ inch objective. The former is quite enough to show most if not all distinctive points, magnified to 120 diameters. No measurements have been attempted, but the following account is as accurate and detailed as possible.

LASTREA DILATATA.

In old well-established plants the scales are often very large, especially at the base of the stipes, and of crisp texture. The shape varies, being either oval with a blunt point; broad, narrowing towards a long apex; or narrow with a very long and thin apex.

The base, at point of junction with stipes, is usually cordate, i.e., hollowed in a heart-shaped way. This is only seen when specimens are carefully detached. The distinctive brown stripe consists of a number of veins filled with dark brown colouring matter; these appear to be stouter than the uncoloured, but when magnified 720 times it will be found that two, three or even four closely crowded have been simulating a single thick vein. Dark veins thicker than the uncoloured do however occur.

They all spring from a red-brown opaque mass which lies in the scale tissue at the centre of the basal curve, and run in a very straight, rigid way upwards. The density of colour varies considerably, in some cases being almost yellow or light brown, in others so dark that the veins almost seem to stand up from the surface. The band formed by them is usually noticeably wide.

At their junction with each other (this is referred to more fully below) the thickening which ensues is darker than the prevailing vein-hue; and the band (stripe) is of fairly uniform width until the point is reached at which the whole scale narrows. From there upwards only a few dark veins continue to near the apical point. The colourless veins behave distinctively, forming a margin throughout the scale from base to apex. At the base they run outwards and upwards, but at the extreme margin of the scale cease to ascend. Instead, they bend in what can best be described as a series of "swirls," and look not unlike fingerprints. These "swirls" or series of curves are fairly regular, occurring here and there marginally higher up but to a less degree.

As the scale narrows the colourless veins become very few, but continue to the apex, which is frequently of quite transparent tissue.

In general, the veins give (whether coloured or not) a rigid, stiff impression. In all scales they form a network ; but with *L. dilatata* the meshes are long, and narrow, as each vein runs for some distance before joining another. The point of junction is fairly acute, so that the "meshes" are more or less diamond shaped ; narrow, because the veins are close together.

The actual edge of the scale has a few projections of tissue, or fringes, generally comparatively wide and short, narrowing to a bluntish point ; colourless, with at most two or three weak veins. These fringes are mostly near the base.

There are also a few glands to be seen, very small transparent bodies protruding from the edge ; club-shaped, or shortly stalked with globular heads, or sessile. They occur mostly near the base, and when magnified 720 times are seen to contain dark close-set granules. Some trace of glands or similar bodies was suspected on the scale surface in certain instances, possibly connected in some way with the dark veins. This is, however, doubtful, as a set of scales (obtained from shade in a Staffordshire garden) had extremely strong dark veins but practically no glands at all.

It has been noticed that the narrow form of scale is frequently more glandular than the broad type, and that a gland or two may be found near the apex.

In *L. dilatata* and *spinulosa* occasional note was made of clusters of extremely small bodies, varying in number from two to six or eight, on the scale surface : circular or oval, colourless. These were not water-drops, or spores ; being very occasional they are not distinctive.

LASTREA SPINULOSA.

We are accustomed to think that the scales of this are without a stripe, but close examination shows that there is a faint band of darker veins. These, however, are less pronounced at the base and more numerous towards the apex, than in *L. dilatata,* and at most pale brown. The whole of the narrow point at times is filled with them, so much so that this is almost a distinct feature.

The stripe usually is widest at about the middle of the scale, and its veins are not so much thicker than the uncoloured, differing in this from *L. dilatata.* The veins in general are thinner, close together, and, although about as long as in *L. dilatata,* do not form quite such acute angles at their junction ; the " meshes " are slightly rounded or curved at the ends, and the thickening there is less pronounced. The colourless veins vary much in behaviour. Some scales from a wood near Doncaster showed hardly any trace of " swirls," but the veins on each side of the stripe at base bent out in a radiate fashion, and above that ascended in more or less direct lines. Others from different localities showed " swirls " of an extreme nature, very irregular and maze-like, contorted in every direction.

It is thought that this formation in general has a direct connection with the type of hollowing of the base. When this is cordate, both in *L. dilatata* and *L. spinulosa,* the " swirls " seem more pronounced than when the base is merely excavate ; but in any case they are nearly always more frequent and definite in the latter and the basal veins of this have a " sagging " look quite unlike *L. dilatata*'s rigidity.

Compared with *L. dilatata*, the projections at the edge of the scale are more numerous, longer, and narrower, and more irregular in outline. They are mostly confined to the base, but now and then one occurs near the apex.

The glands vary ; usually there are more than in *L. dilatata* ; a scale will be found on which nearly all are sessile, while in another case many will have a stalk markedly longer than those of *L. dilatata.*

They are also found (in small numbers) more often near the apex than in that species. At 720 diameters the granules in them are seen to be pale brown and less compact. The scale is usually smaller, often much smaller, and with a narrower point which at times is hair-like.

The base may be cordately hollowed but is often only just curved. After comparing these two ferns one gets an impression that the scale-characters of *L. spinulosa* are laxer, less robust and less definite. There is a sense of weakness and disorder, harmonizing with the plant, which to me always seems uncertain of itself—unlike its swarthy full-blooded relative.

LASTREA ÆMULA.

Examination in this case was restricted, as there was not so large a supply of scales available, but very distinctive results were obtained.

No trace of a coloured stripe was found, though if anything the veins were paler towards the base of the scales. The veins are thin, and set wide apart, and short ; so that the "meshes" of the network are about half as long only as those of *L. spinulosa* or *L. dilatata.* There is at times an approach to a rectangle or oval in shape, as the veins tend to turn in towards each other when joining ; and "swirls" are noticeably absent. An extremely thin line, perhaps a vein, is often to be seen running diagonally across a "mesh," or beside and parallel with a vein from junction to junction.

Being colourless, the course of veins in the apex can be clearly followed. One or two run up some way towards the point and from them very short lateral veins project towards the margin, the general effect producing a resemblance to vertebræ.

Fringe-projections are not numerous, but long, and consist of short jointed lengths of tissue ; in this apparently differing from the two previous species which seem to have homogeneous fringes. Often, if not always, several such joints towards the fringe-apex are veinless.

As might be expected in the Hay-scented Fern, the glands are numerous. They are either stalked or sessile, the largest being bigger than in *L. dilatata* or *L. spinulosa* ; a few are to be seen on the scale surface and along its edge there is a fairly close row from base to apex. Even the fringes bear several. Chlorophyllose instances occur ; in fact, when sufficiently magnified probably all will be found to contain chlorophyllose granules. The fringes are found, by the way, not only on the lower part of the scale but throughout its length.

A number of the minute round bodies seen in the two previous ferns were specially noticed in *L. æmula.* Near the base of the scale they were colourless and scattered, usually along the sides of veins. Towards the apex they were chlorophyllose and in groups, mostly at one or both ends of a " mesh " where veins united.

The scales are usually deltoid at base, narrowing upwards into long isosceles shape ; the edge is almost smooth with a slightly sinuous outline but without swellings such as are to be seen in this fern's relatives ; these swellings in the latter are quite distinct from fringes and usually contain " swirls " and are perhaps due to that vein formation.

During the inspection of the first two *Lastreas* a note was made of certain hair-like strands running more or less transversely across the surface of scales, but it was only when a magnification of some 720 diameters was employed that closer attention seemed worth while, and the result of this led to special care being taken in all subsequent cases. The true nature of these strands must be left to others to explain, but there appears to be a distinctness of character about them in each species when present, and a note is therefore added here.

In *L. dilatata* these " hair-veins " are few, mostly found at or near the base of the scale, long and not much branched and of a rather rigid, straight, firm appearance ; here and there minute swellings on them may be seen, but on the whole they can be described as smooth ; and they share the dark colour associated with *dilatata* scale veins, though naturally, being extremely thin, this colour is not very deep.

Those of *L. spinulosa* are equally long or longer but hardly coloured ; the branching is much more frequent and occasionally a tiny projection or two is to be seen as if a branch had been thought of and given up. There is a good deal of twisting to be observed, something after the fashion of a piece of string cut haphazard off a parcel and thrown anyhow on the floor : and the edges of these strands bulge with minute pea-like swellings more than in *L. dilatata*. Also they are found quite as much at the middle of the scale as at the base. If they occur in *L. æmula* they are exceedingly thin, quite translucent, very few, and hardly visible.

Those in *L. spinulosa* show no trace of origin, i.e., they appear to lie across the veins proper loosely and unattached. After very careful looking in *L. dilatata* one or two ends were discovered at their apparent source, which seems to be at the side of a vein, or in the granules collected at a vein-junction.

There is a solitary specimen in my fernery of *L. dilatata cristata*, and this was next selected. It is a depauperate fern, the fronds consisting mostly of tufts on a bare rachis ; and it was not surpsising to find that the scales were in some ways abnormal, though the veining was of true *dilatata* type and calls for no comment. But, scattered freely throughout the scale margin, glands were seen in small numbers, equally scattered and in abundance long narrow fringe-projections appeared, quite unlike the *dilatata* style.

My one *lepidota* plant was next called upon, very suitably, as owing its name to its scaliness, and it responded admirably ; its veins are about as thick as in *L. spinulosa* but neither weak as in that nor stiff as in *L. dilatata* : rather they are firm but gently sinuous in a long slow curve, close together but not in any way confused, each being clearly separated from the next. They form " meshes " of a long narrowly elliptical shape or nearly rectangular. Granular conglomerations on the surface (to use long words for very small matter) rather than glands appeared : there was practically no trace of fringe : and a few " hair-veins " of the *spinulosa* type were seen near the base, which was generally excavate.

" Swirls " were almost non-existent, and a few only of the minute bodies (in this case pale) noted in other previous cases but more quadrangular than round were found lying between veins at the base.

LASTREA REMOTA.

Then came an inspection eagerly awaited, that of *L. remota*, fronds of which were very kindly supplied by Dr. F. W. Stansfield, to whom I am indebted for much of my material as well as for the original interest in *Lastrea* differences.

The scale veins are much like those of *L. spinulosa* in thickness, strength, distance apart and " mesh " formation, but at this point all close resemblance of the scales ends, and so far as scales are concerned no relationship with *L. spinulosa*—or with *L. filix-mas*—could be detected, other than that of a generic type.

There are no real " swirls " though there are swellings at the margin, chiefly towards the middle of the scale, in which the veins are bent outwards and round in strong curves ; and there are no fringe-projections, nor could any glands be seen, nor any definite stripe, but here and there veins were coloured pale brown : all veins are rather straighter and stronger than *L. spinulosa* and the base is either cordate or excavate. Clusters of the minute bodies already referred to occurred, closely packed or in lines one after another, not oval or round but "cottage-loaf" shaped and of a pale biscuit hue : and though a most careful search was made for "hair-veins" none were found, their place being taken by the minutest wrinkle-like veinings mostly found springing from granular masses at vein junctions. The scales are long, of narrow isosceles shape.

My own collection includes a *Lastrea remota*, examination of which produced results so closely similar that they need not be set out. When viewed with a magnification showing a large area of scale it was noteworthy that the surface is thickly spotted, a pale brown colour, as though stained with iron mould, this being due to the brown granules at the vein junctions while the veins are mostly colourless.

Dr. Stansfield sent fronds of *L. dilatata Boydii* for experiment since this plant had been suspected of hybridity, and, though certainly not conclusive, the points it had to show do suggest closer connections than anything found in *L. remota* : at the same time this very attractive fern has quite definite scale characters of its own.

In the GAZETTE for September, 1916, Dr. Stansfield described it and said that the dark stripe ends about half-way up the scale, and so this point came in for attention first, when the veins concerned were found to be of two distinct kinds ; there are a number of them coloured rather pale brown (slightly darker than in *L. spinulosa*) reaching about half-way up the scale with a wide margin each side uncoloured, and there are also a number congregated at, or not far above, the base which are a very dark red, short, very rigid and rod or narrow spindle shaped. Sometimes there are only two or three on a scale, more often a number of which some will be wide apart from each other and some will be clustered in bundles side by side. The other veins, whether plain or coloured, are set well apart, and are thin, strong, straight and long, with the point of junction frequently forming a very distinct U or ∩, at each end of the " mesh." There are minute " wrinkle-veins " as in *L. remota* and similar tiny " cottage-loaf " bodies rather smaller than in that fern : and the scale surface is spotted in the same way but to a less degree, the scale base being usually cordate, and the apex long with a long narrow point. The scales generally cluster thickly at the base of the stipes and are thinly scattered higher up so that the stipes appear shaggy below and bare above. No glands or " swirls " were found, and the fringe-projections were reduced to numerous small protuberances of a very uniform size, most if not all containing the end of a vein which makes a short outward bend and stops abruptly. The general effect of this was curiously " machine-made."

Now comes

LASTREA FILIX-MAS.

As a whole the veining is not unlike that of *L. spinulosa*, but in detail there are noticeable differences, the veins of *L. filix-mas* being rather thicker but pale and with much the same weak look ; rather further apart especially down the scale centre. A few " swirls " occur here and there along the margin, mostly slight but sometimes very strong especially when at the base, which is usually excavate ; but the most marked feature of the veining is the " mesh " shape, which is irregular owing to the point of junction at one end being frequently acutely angular while at the other end it will be curved or quite rectangular. At the junctions the brown granular matter is very loose-set, and occasional clusters of minute quadrangular-rounded bodies of a duller green than in previous *Lastreas* are to be found, smaller also in size. For some time no specially marked feature (other than the " mesh ") could be found in the veins until an instance—the first of a very few—occurred in which the same type of short rigid veins that is so distinct in *dilatata Boydii* was found.

The colouring was far paler but the shape and thickness and position (near the base) and length were closely similar, but as already mentioned the occurrences were rare. The fringes on the contrary were numerous, at the base long narrow and ragged in outline and further up the margin, even at the apex, standing out boldly and stiffly, of a broader kind than lower down. Some are divided at the tip into two, three or four points, while others are undivided but with a curve at the tip almost hook-like.

Glands seem to be absent, and in looking for them it is important to get the scale quite flat, otherwise what appear to be marginal glands will only be resolved into fringe points when brought into focus : scales of *L. filix-mas* have a tendency to curl, a trick shared still more strongly by *L. dilatata Boydii.*

One often finds fronds of *L. filix-mas* which are normal in outline except at the tip where a division into two frequently occurs, and it is curious that this habit extends to the scales, instances being not uncommon in which their apex is split. At first a tear in the tissue was suspected but the smooth and perfect condition of both points thus formed showed that this idea was wrong. It has already been said that the scales do not help to show that *L. filix-mas* is a parent of *L. remota,* unless a hybrid may be expected to lack its parents' most definite features.

LASTREA PSEUDO-MAS.

This fern and the next species are more difficult to describe than the foregoing in spite of pronounced differences ; this is partly due to a certain amount of variability in the scales of *pseudo-mas*, partly to a negative character, i.e., the absence of points, partly to a sort of indefiniteness and " flabbiness " that needs to be seen to be properly appreciated.

The golden brown colour of the scales is well-known in this case, and the shape can easily be discovered as long, narrow, base almost straight across, apex very long and narrow. The veins are very crowded, either uniform in thickness and, if so, thinner than in *L. filix-mas* ; or else as thick, at centre, as in that species and then much thinner at margin : fairly long as a rule but somewhat variable in this, and weaker, "flabbier," than in any previous species, forming narrow irregular "meshes."

At the margin near the base a few "swirls" occur ; there is very little fringe and what projections there are, are short, a very few of them being similar to the little knobs seen on *L. dilatata Boydii* : and throughout the scale the veins tend to be coloured a very pale yellowish tint except when they are very thin near the margin. The colour is stronger in the tissue near the vein junctions and there, too, small darker spots often occur ; and the veins are darker through the apex and continue to the point of this without forming "meshes," running side by side.

No glands or "hair-veins" were found but the small wrinkles seen in *L. remota* and *L. dilatata Boydii* were noted, also occasional short white veinlets across "meshes" or springing from junction points.

Smaller specimens of scales show some variation in being fringed almost to apex with protuberances, these being sometimes almost "Boydian" in form ; or short, narrow and hooked at the end ; or similar to the forked or trident-shaped type of *L. filix-mas* but with a wider and shorter base—almost as wide as long. It is perhaps worth noting that a specimen of scale perfect at base will be found to have the veins there darker than elsewhere.

LASTREA PSEUDO-MAS VAR. PINDERII.

As I had one plant of this it was pressed into service, and showed veins more uniform in thickness than in the type, without "swirls," straighter, and less coloured. Otherwise it presented every scale feature typical of well-developed specimens of *L. pseudo-mas.*

LASTREA PROPINQUA.

My own specimen again furnished material ; this plant (like many others in my collection) came from Sale. The veins are thin, close together at the base, wider apart above and crowded again at the apex, forming " meshes " of varying width and (as usual in the *filix-mas* group) irregular in junction, i.e., one end is angular and the other rounded, this being a pronounced feature in this species.

The veins are rather long and bent from side to side in a manner not easy to describe but very noticeable when seen : the bend is not between one junction-point and another but is best seen if a fairly large section of " meshing " is observed, when a long curve will be apparent in one direction for an appreciable distance and then proceeding upwards in the other direction. Occasionally the veining is wide apart and straight throughout the scale. There is a large quantity of light brown very loose-set granules, with some trace of transparent granular matter in the few glands ; the projections (fringe) are short, blunt or pointed, found all along the margin ; the apex is thick and short with an acute point, and the base is hardly excavate, with yellow-brown colouring.

L. PROPINQUA VAR. ABBREVIATA.

Material in this case was very kindly supplied by Dr. S. P. Rowlands. The scales show a marked resemblance to type with equally marked special points ; the veins have a tendency to lie as far apart from the base as they do at the centre of *L. propinqua*, until the apex is approached when they become crowded. Those at the base (which is usually broad, hardly excavate but at times narrowed and rounded off) are colourless, forming pentagonal or hexagonal " meshes " like the cells of a honey-comb, as wide as long.

Small transparent glands are to be found, and, on the surface of the scale, but rarely, glandular bodies brown in colour with stalks apparently composed of loose granular matter : and here and there in some frequency along the margin very narrow "hair-like" bodies occur, quite transparent but containing quadrangular chlorophyllose granules at regular close intervals, these "hairs" being either loose or springing from small brown granular conglomerations. The length varies considerably. They were noticed on previous species but so rarely that no attention was given to them.

LASTREA OREOPTERIS (*MONTANA*).

Specimens of this plant were obtained from a wood near Doncaster, a garden in Staffordshire, and open ground not far from Matlock in Derbyshire. Scales from all these fronds agree in essentials but the two last had each small peculiarities noted below.

The veins are wide apart, mostly short and pale brown but lengthening towards the apex, which is short with a rather broad point; the "meshes" up to the longer veining are not unlike those of *L. æmula*, but the veins are very thin, this being only observed by close examination, as the brown colouring makes two or three appear to be one and so extremely thick. A number of small glands, colourless or reddish, will be found on the surface of the scale, and a very few minute ones on the margin, where also are very occasional minute protuberances: the scales are subulate (awl-shaped) and the base practically straight.

On those from Staffordshire there were seen excessively thin translucent shining white hairs, twisted, arising from granules at the margin; the Derbyshire examples showed a mass of very thin reddish much-branched hairs spread all over the surface, and in this case the "meshes" can only be described as muddled, so irregular were they in formation and direction—instances were noted in which a couple turned at right angles to the main body.

LASTREA RIGIDA.

The scales in this fern are clustered most thickly at the base of the stipes, giving it a very rough appearance as, at least in dry weather, they are distinctly stiff and stand out instead of lying flat ; this detail was particularly noted on a frond sent by Dr. Stansfield, and as the scales on this were in far better condition than other material on hand they only were selected : the remainder however agreed closely with the following description which can presumably be considered typical.

The base is nearly straight, though occasionaly approaches to an excavate-cordate outline will be found ; there is a pale yellow brown tinge which may extend a short distance upwards, and the basal " meshes " in one or two rows are short, wide, and even circular, above this resembling the *L. filix-mas* type with the junctions angular or rectangular and " meshes " long with the veins wide apart, colourless, and thin. Here and there " iron-mould " stains appear as in *L. remota*, but this does not suggest any connection. There are the small white wrinkles at the junctions and to some extent elsewhere, and in addition there are very small clear white sinuous veins running beside, across or between the principal veins and containing very minute quadrangular-rounded colourless granules—these, rarely, are chlorophyllose.

The tiny bodies frequently mentioned already occur in clusters of variable extent, in shape of the " cottage-loaf " or *L. cristata* type, pale brown usually, or colourless, distinctly larger than in other *Lastrea* scales.

No " swirls " were seen, the general direction of veins being upwards ; the small protuberances that occur are rounded and blunt ; a few glands will be seen either sessile or club-shaped, colourless or pale brown, filled with loose granules or empty. Occasional loose masses of granules are to be found on the surface ; the apex of the scale is long, narrowing rapidly and hair-like at extreme end which is blunted, containing few veins and a good deal of brownish granular matter. The extreme marginal vein is often clear, as in *L. uliginosa*, which may be consulted for a fuller account of this point.

LASTREA CRISTATA.

Thanks to Dr. Stansfield fronds of this and the next two ferns were received in time to incorporate notes on them here ; only *Lastrea thelypteris* is unavoidably omitted from lack of material.

The base of *L. cristata*'s scales is cordate or cordate-excavate, tinged pale brown ; the apex is short and broad with a flattened point ending acutely.

Its veins throughout are rather variable in length, but in general long, gently curved, thin, colourless, wide apart, forming at base very irregular " meshes," but these elsewhere are well defined and can hardly be said to resemble either those of *L. dilatata* or *L. spinulosa*, being rather almost of the *L. filix-mas* type ; the junctions are curved or angular and from them spring *remota*-like wrinkles which are longer than in that fern. The minute bodies found in most *Lastrea* scales are present, colourless, oval, divided across the centre by a line. Glands are practically absent from the margin, one only having been seen, rather large and club-shaped. There are no " swirls " but very slight curved protuberances at margin, and on the scale surface very minute sessile glands occur, pale brown : also, similar in colour, granular masses made up of large loose-set granules : the apex of one scale was entirely brown from this cause and this doubtless will be found occasionally in this fern's scales. As in *L. remota*, no particularly noticeable feature could be discovered though undeniably this would be most welcome ; perhaps someone else will be more fortunate.

LASTREA ULIGINOSA.

This is a difficult plant and cannot be considered as satisfactorily dealt with here. The scale base is excavate or nearly straight, dark brown, with short " meshes." The colour appears to be due to a large amount of loose granular matter which is found throughout the scale ; though this higher up, together with the veins, is colourless or at most of a pale brown hue. The veins are thin, closer than in *L. cristata*, variable however in distance and in length, forming at times very long " meshes " and in general being noticeably curved at junction with each other, seldom angularly connected : not making " swirls " but bending considerably especially marginally. Protuberances are almost absent and very slight, small outward curves rather than projections ; glands, too, are very occasional, sessile or shortly stalked, clear, or dark brown, very minute, marginal and on surface. What look like a cross between wrinkles and " hair-veins " occur near the base, and at the margin a very few white rather rigid hairs may be seen.

The apex is difficult to examine ; a good specimen shows it to be rather long, narrow, flattened, with a blunt tip ; the apical veins are few. In a good light the extreme marginal vein stands out very distinctly—one should say marginal veins ; this is a marked point, as often the margin's edge appears to consist of tissue with no definite boundary.

AZORES TYPE OF *LASTREA DILATATA*.

Dr. Stansfield in sending this writes " some would make it a distinct species." Scale details can hardly settle this but there are differences between it and our fern quite as marked as the resemblance so far as scales are concerned. It is not easy to examine but the following points emerge.

The scale base is excavate-cordate or nearly straight : the apex fairly long, narrow, extremity blunt or truncate : the extreme basal " meshes " are small, square, with veins full of red brown granules : the base is so dark that visibility thereabouts is distinctly poor.

Above, the veins are very crowded, very dark at the centre, apparently coalescing as in our *L. dilatata* to form what look like one thick vein, but possibly some of the central veins are much thicker than others : all are coloured right to the margin though there the red-brown becomes only pallid. The " meshes " are variable in length, the darkest tending to be shorter, and the junction points are more or less rounded. There are no " swirls " but the veins are more bent and less rigidly carried upwards than in our type. Short white hairs project from the apical margin and are found near the base, and there also long branching white hairs like those of *L. spinulosa* occur : on the surface glorified wrinkles are common, thicker and longer than in any British *Lastrea* seen so far. The outstanding point is the number of globose marginal sessile glands : these positively swarm, and their presence on the surface was suspected but not proved : they do however appear on the longish narrow fringe-projections which are another rather marked feature in this fern, to be found mostly near the scale base but here and there, too, right up to the apex.

It is suspected, and most particularly in this case, that the veining in some *Lastrea* scales is in two layers : this is by no means certain, however, and is simply mentioned as a possibility worth more attention.

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette.*

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

F. W. STANSFIELD, M.D., F.L.S.,
120, Oxford Road,
Reading,
Berks.

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JAN 12 1932
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December, 1931.

EDITED BY

F. W. STANSFIELD, M.D., F.L.S.

(120, OXFORD ROAD, READING.)

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, F.L.S., "Monkhams," Lower Road, Great Bookham, Surrey.

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EDITORIAL NOTES.

The Gardeners' Chronicle of October 31st, 1931, contains an interesting article by Mr. C. D. Darlington, of the John Innes Horticultural Institution, showing that flowering plants with an extra number of chromosomes in the cell nucleus tend to produce giant forms. This tendency is illustrated by a number of genera and species, including *Primula Sinensis* and *P. obconica*, *Datura stramonium* and *Campanula persicifolia*. These observations are in line with those of Dr. Lang, Professor Farmer and others on the fern *Dryopteris paleacea apospora cristata*, Cropper, which has only half the normal number of chromosomes and which is by far the miffiest and feeblest growing form of the species.

Dr. Rowlands has found *Woodsia Ilvensis* this year in North Wales growing mostly in inaccessible places from which it is not likely to be exterminated. Mr. T. B. Blow has found in the neighbourhood of Lake Annecy, Haute Savoie, France, a highly developed form of *Asplenium Ruta-muraria*. It has

JAN 12 1932

fronds 3 to 4 inches long and is tripinnate and abundantly fertile, but the ultimate segments are not altered in shape. A similar form is figured in Britten's "European Ferns," but without any distinctive name. Mr. R. Bolton says he has found the same kind of thing in this country. It may possibly be a mere "state" of the species and it remains to be seen whether the decompound character will persist under cultivation. As collected it looks very different from the species as usually seen.

The Editor has still a fair stock of *Cystopteris alpina forma dissecta,* and will be glad to send a plant to any member who may desire it and who is willing to pay the cost of postage. This fern is best transplanted while in a dormant state.

APOLOGIA,

An old French proverb runs "Qui s'excuse s'accuse," in spite of which I think an apology is due for my absence from the General Meeting at Southport—the first occasion for ten years.

I had made all arrangements for attending the meeting and subsequent hunting trip to Whitewell, but, unfortunately, lost account of the day of the week. I had received a shock on the Saturday before on discovering an outbreak of disease in my Daffodil collection necessitating their immediate lifting, treatment and replanting away from home. This sudden and heavy task upset all my holiday arrangements and was the cause of my omission. It was only on the morning of the meeting I discovered my error and telephoned from home to Dr. Stansfield at Southport asking him to explain my absence and that I should join the party at Whitewell that night.

I am sensible of the compliment members have paid me in re-electing me as President of the Society for the ensuing year. I can only assure members that I shall do everything in my power to further the interests of the Society, but I think that next year some other individual should be elected to the office of President who may be able to devote more time and attention to the Society's interests.

W. B. CRANFIELD.

OUR FRONTISPIECE.

Dryopteris (*Lastrea*) *dilatata foliosa-cristata.*

As the present number is concerned, to some extent, with "British ferns abroad," we present a portrait of a very beautiful and little-known foreign variety of a British species. The original was found on the Island of St. Michaels, Azores, by the late Mr. George Brown and sent by him to Messrs. Stansfield, of Todmorden, about the year 1870. So far as we know no figure of it has been published before although the late Colonel A. M. Jones, who thought very highly of it, made a nature print of it shortly before his death. It is by far the handsomest variety of the species to which it belongs. It will be noticed that, not only the fronds and pinnae, but also the pinnules in the basal half of the frond are crested. The fronds are also of a brighter and more glossy green and have a more evergreen character than in the British form. The Azores type of *dilatata* differs from the British form in being thinner in texture and much more foliose, while the scales are markedly different as indicated by the Rev. E. A. Elliot in our last number. Also it may be noted that these are macroscopically much narrower and less chaffy than in the British type. It is perhaps not quite so hardy as our native species, but does quite well out of doors during ordinary winters and has withstood some very severe ones (such as that of 1927-28) with simple glass protection. Mr. MacSelf has had it doing quite well in the open air in a sheltered corner for several years. The photograph is from a plant grown in a cold house in the Editor's garden.

THE ANNUAL MEETING.

The Thirty-sixth Annual Meeting of the Society was held on Thursday, August 27th, at the Prince of Wales Hotel, Southport. In the absence of the President the Chair was taken by Mr. T. B. Blow, F.L.S. (Vice-President). Members were present from Dumfries, Lancaster, Kendal, Southport, Haslingden, Accrington, Grange, Welwyn (Herts), Great Bookham (Surrey), Birdbrook (Essex) and Reading.

The Chairman regretted the absence of the President and welcomed the members to Southport.

The Minutes of the last Annual Meeting were read, confirmed, and signed.

The Hon. Secretary read his report as follows :—

"Mr. President, Ladies and Gentlemen,

The past year has not been an eventful one in the history of the Society. While there has been no dramatic development the Society has practically maintained its level and has not sustained any financial or other disaster (beyond the inevitable loss of some members by death), in which it is perhaps more fortunate than many institutions and individuals. The number of members is now 123, one of whom is a life member of old standing and another of more recent date. There are nine honorary members, the latest addition being Mr. W. Wilson, of Kendal, one of the founders of the Society. Mr. John Gott and Mr. J. J. Smithies, both of Kendal, have died full of years and honours. Both were among the founders of the Society and both have rendered yeoman service to it during their membership. Mr. C. H. Wardill, of Bridlington, has also died : he was an old and faithful member, though he rarely, if ever, attended a meeting. Three members have resigned and two or three have lapsed from other causes.

New members at, and since, the last meeting are :—

Mr. H. Stinchcombe, of Coventry.
Miss Jessie Stansfield, of Sale, near Manchester.
Mr. R. H. Sudell, A.R.H.S., of London.
Professor Weiss, F.R.S. (President of the Linnean Society).
Mr. A. H. G. Alston, F.L.S., of the British Museum of Natural History, London.

The mild winter and wet summer have been favourable to the growth of ferns, although most of us, ferns apart, would have been glad to see more sunshine. Few of us, I fear, have had much leisure for fern-hunting and I have not heard of any important "find" during the year beyond the very promising *grandiceps* form of (supposed) *Dryopteris œmula* found by Mr. Alfred Kirby in South Wales. There seems some reason to believe that this will turn out to be really *œmula* and not *dilatata*, although the plant is still too small to make the diagnosis quite certain since no sori have yet developed (with me). I have here a frond which shows the varietal character distinctly. (Frond exhibited.) Our honorary member, Dr. G. C. Druce, F.R.S., who is one of our few remaining octogenarian members, has returned from the Levant (Rhodes) whither he went to recruit his health after a rather severe illness, and where he found some lax and decompound forms of *Dryopteris filix-mas*. One of these has a deltoid outline and bears a curious resemblance to *aristata* (*dilatata*), but the scales are distinctly those of *filix-mas*. I hope to raise plants from the spores of one of these forms. The deltoid one had no spores upon it.

F. W. STANFIELD."

The Hon. Treasurer, Mr. J. J. Sheldon, read his financial report as follows :—

BALANCE SHEET.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance from last year	55	5	2	Affiliation Fee to R.H.S.	2	2	0
Subscriptions ...	45	1	9	*Gazette*, Dec., 1930 ...	17	17	1
Advertisement ...	2	2	0	,, June, 1930 ...	17	8	6
				Postages and Sundries	3	1	4
				Expenses at Annual Meeting	5	4	6
				Balance at Bank ...	56	15	6
	£102	8	11		£102	8	11

Audited and found correct, August 22nd, 1931.

PERCY GREENFIELD,
Auditor.

Mr. Robert Bolton proposed and Mr. Whiteside seconded the adoption of the Secretary's and Treasurer's reports. Carried.

Mr. MacSelf proposed and Mr. Thos. Bolton seconded the re-election of all the surviving Officers and Committee. Carried.

The following new members were elected :—

Mr. Richard F. Ransom, Wymondley Bury, Stevenage, Herts.
Mrs. Illingworth, Hanlith Hall, Bell Busk, Yorks.
Mr. Edward J. Stephens, Rose Lawn, Digswell, Welwyn, Herts.
Mr. J. D. Dixon, Rochell Park, Dumfries.
Mr. Fred Hollings, 37, Garbett Street, Accrington.
Mr. Alfred Hellyer, Assistant Editor, *Amateur Gardening*, London.

It was proposed by Mr. R. Bolton, seconded by Mr. Whiteside, and carried, that the next Annual Meeting be held at Southport, to be followed by a fern-hunting expedition in Scotland.

Mr. Sheldon exhibited fronds of a number of seedling ferns and was awarded Certificates for the following :—*Scol. v. crispum sagittatum*, Sheldon ; *Scol. v. laceratum grande*, Sheldon; *Blechnum spicant bipinnatum* Sheldon (seedling from *B. s. serratum*, C. Henwood) ; *Athyrium f.f. plumosum laxum*, Sheldon (seedling of the Druery strain).

Mr. Askew exhibited a frond of *Polystichum angulare perserratum grandiceps*, Askew (a cross between *perserratum* Patey, and *grandiceps*, Moly), and was awarded a Certificate.

The Rev. Canon Kingsmill Moore sent a box of fronds of *Polystichums*, all finely grown and mostly seedlings of the *plumose divisilobe* and *lineare* sections, but there was no outstanding novelty among these. Also a frond of a wild " find," *Polystichum aculeatum sinuosum*, having a wavy stipes and rachis, and the appearance of an intermediate between *aculeatum* and *angulare*, for which he was awarded a Certificate.

Mr. E. J. Stephens, of Digswell, Welwyn, sent a frond of a finely crested form of *Lastrea pseudo-mas*, which he had found in 1929 in Eskdale, Cumberland. It was a distinctly handsome form, but was hardly distinguishable from the old "King of the Male Ferns," although the termination of the frond seemed more slender than is usual in the old *cristata*. As, however, the latter varies, in this respect, in different fronds even on the same plant, it was thought desirable to await further developments and, if possible, to see the whole plant before making an award. In any case, the fern is a very interesting and desirable "find," and we shall hope to see further fronds, or the whole plant, another season.

A vote of thanks to the Mayor and Corporation of Southport for the use of the room and for their encouragement of the cult of British ferns at their great Show was proposed and carried with acclamation, as was also a vote of thanks to Mr. A. J. MacSelf for his exertions on behalf of British ferns.

The members adjourned for a final visit to the Show and, afterwards, a small party went on by motor car to Whitewell, Yorks, the selected locality for fern hunting, where they arrived in the evening. They were joined next day by the President, Mr. W. B. Cranfield. Several enjoyable days were spent in the neighbourhood of Whitewell and expeditions were made to Pendle Hill, Lancs, to the Trough of Bowland, Malham, etc. A visit was paid to Browsholm Hall, the seat of Colonel Parker, on whose estate the late E. J. Lowe reported that *Dryopteris uliginosa* had been found. Likely places in the park were carefully searched, but neither *uliginosa* nor *cristata* was seen, although a few plants of *spinulosa* were detected. The members were shown a very interesting, slender and crested variety of *filix-mas* which had been found on the estate by Mrs. James Wright, the wife of the Colonel's head gamekeeper. It was in the way of Martindale's and Burton's crested forms of the Male Fern, but differed from both of these in its more slender build and in the entire absence (for the present at least) of the irregularity which is so often found in the crested forms of this species. It remains to be seen whether these characters will prove permanent under cultivation. The members were entertained to tea by Colonel Parker and his family, and were afterwards shown over the house, which proved a veritable museum of rarities in the way of pictures and antique furniture. On another day after a visit to Malham Cove, the party were entertained to tea by Mr. and Mrs. Illingworth, of Hanlith Hall, where the fern garden and rock garden were examined with much interest and pleasure. Two or three days were spent in miscellaneous hunting in the Trough of Bowland, but although a few minor variations were noted and there was plenty of material in the way of *Blechnum* and *Lastrea montana*, no " find " of any importance was made until the last day, when only two members of the party remained, viz., the Hon. Secretary and the Rev. E. A. Elliot. These two forlorn hopers went out for a final hunt on foot, which was necessarily confined to a few miles from the hotel. The first thing noted was *Polypodium phegopteris*, a species which had not been previously seen. In its immediate vicinity was found an incised form of *Dryopteris paleacea* (*Lastrea pseudo-mas*). It was such a huge plant that it was quite hopeless to attempt its removal with the means at our disposal, so we contented ourselves with taking spores, of which we could easily have collected a snuff-box full. On our way back to the hotel we noticed plenty of *Campanula hederacea*, *Pinguicula vulgaris* and a plant or two of *Drosera rotundifolia* growing among the grass and *Sphagnum* by the side of the tarred road and bearing testimony to the general moisture of the locality. Shortly we came to a little ravine, down which a stream of clear water trickled and we decided to investigate it. It was not long before we came across a clump of a plumose form of *Dryopteris* (*Lastrea*) *montana* growing in a morass of *Sphagnum*, overgrown by the fronds and interpenetrated by the rhizomes of the bracken which grew all around. With some difficulty we managed to extract the *montana* after cutting a circle around it through the bracken roots and rhizomes. The " find " was quite thorough in character throughout, but, as it was growing under extremely unfavourable conditions, it could not be fairly compared with the best of its predecessors in this type as grown under cultivation. We must wait to see what it will be under proper culture. It may be noted that it is twenty-three years since the last "find" of a plumose *montana* was recorded—that one being by the present writer in N. Wales in 1908. Previous "finds" had been made by Messrs. John Titterington, J. M. Barnes and George Whitwell—all very beautiful things of similar character.

F.W.S.

BRITISH FERNS AT SOUTHPORT SHOW.

A MAGNIFICENT DISPLAY.

The Hardy Fern classes have firmly established themselves as an important feature of Southport's great Flower Show, and this year there were improvements in the classification and in the staging which enhanced the interest of the whole display for visitors as well as exhibitors.

By a change of wording in the schedule it was made perfectly legitimate for exhibitors in the big group class to excavate or to elevate in order to produce artistic effects. In most cases the competitors took advantage of their liberty, and as there were seven groups in the class the whole length of the tent was filled with the rich luxuriance and inimitable grace of a comprehensive range of choice ferns.

For the pot plant classes the height of the staging was reduced, and thus the plants were brought to a level that showed up the beauty of their fronds to fullest advantage. This was a great improvement upon former years when the taller kinds were staged too high for proper inspection.

Classes which had not proved successful in former years were deleted from this year's schedule, and in their place new classes were provided for the encouragement of beginners and novices who have not thus far scored successes in the open classes at Southport. Results justified these changes, for the new classes brought some interesting exhibits, and showed that there are novices in the ranks of pteridologists who bid fair to become connoisseurs and successful exhibitors. We may be permitted to remark that in a few instances plants which might have been well in the prize list had their chances destroyed by getting their fronds badly damgaed, apparently, during travelling to the Show. The ease with which fern fronds, especially *Athyriums*, are bruised and broken is one of the biggest problems for the exhibitor, but when one sees fragile begonias, gloxinias, fuchsias and brittle-stemmed primulas packed for travelling by rail or motor lorry and arriving at a show looking as though they had never been moved, it may surely be contended that fern growers also may surmount the difficulties if they will take pains to pack for safety.

Mr. Cranfield's entries were missed this year, but it was really good sportsmanship on his part, after having scored brilliant triumphs three years in succession, to stand down and give others a clear field.

What might have been a serious gap in the group class was filled in the ablest manner by Mr. Robert Bolton, who won the new " Abol " Trophy without difficulty. It would be very interesting to witness Mr. Bolton and Mr. Cranfield both putting up groups and both determined to win highest honours. The judges would have a task to perform to accurately appraise the value of the two groups. Mr. Cranfield's fine big specimens of *Polystichums*, *Athyriums* and *Lastreas* are telling items, and he has so wide a range of smaller ferns for foreground work. Mr. Bolton, also, has some big plumose *Polystichums* and is pretty strong in *Athyriums* of the *setigerum* class and *grandiceps* forms, whilst in *Scolopendriums* he has a marvellous wealth of good varieties and well-furnished specimens. These played an important part in this year's group, and tribute must be paid to his skilful showmanship. It has been common knowledge for years that nobody surpasses Robert Bolton and his son, Tom, in staging sweet peas, and he proved at Southport that he can be just as clever and artistic in arranging ferns. His plants were grouped together in such a manner that each helped its neighbours and yet retained its own individuality and showed off its own distinctive character. Mr. Bolton had things very much his own way in the principal pot plant classes, accounting for the lion's share of first prizes despite the fact that competition was by no means slack.

[Other prize-winners were Messrs. Joseph Lloyd and J. Lovelady in the groups, and Messrs. C. Luckin, of East Grinstead, J. Lovelady and W. F. Askew in the smaller classes.]

The 1931 Show was highly satisfactory from the point of view of a fine display of good ferns, calculated to arouse interest among those who are unfamiliar with their infinite variations and beauty.

As a competition among growers the group class was triumphant, but it is to be hoped that a still greater number of members of our Society will keenly contest the smaller classes. It has been shown that growers from Essex, Middlesex, Scotland and Ireland can take ferns to Lancashire and achieve success. Let none, therefore, excuse himself from exhibiting next year on the plea of the difficulty of transport.

A. J. MACSELF.

MORE NOTES ON FERN SCALES.

In the GAZETTE for June, 1931, Dr. Stansfield noted the absence of remarks on the scales of *Lastrea thelypteris*. His own remark, made subsequently and orally, was that " the scales in this fern are like snakes in Ireland." In any case, none have been examined as yet.

[Scales are not entirely absent from *thelypteris*, but are very rare and fugacious.—*Ed.*]

LASTREA (DILATATA) ALPINA, var. FASTIGIATA.

Dr. Stansfield kindly supplied material in this case, saying that Wollaston wanted to make it [*alpina.—Ed.*] a species. The scale is more or less oval, base slightly excavate ; it is narrowed upwards rather abruptly, forming fairly distinct "shoulders" and above them a short narrow apex. The veins are of moderate thickness, wide apart, the "meshes" very long and so appearing narrower than they really are. Many of these spring from a forking vein at the lower end, the junctions otherwise are not easily distinguished, and occasional "crow's foot" tangles, where several veins meet, add to the difficulty. There is a dark brown stripe running up throughout, broad, nearly one-third the width of the scale about the middle; this narrows upwards in a peculiar way by the sudden ending of its outside veins, a process repeated two or three times in its course. This stripe extends into the apex which is mostly composed of dark veins. At the base of the scale there is often a short pale space before the dark veins begin, and they take their deepest colour about the middle of the stripe: the margin is almost even, a few club-shaped glands occurring in old scales.

POLYSTICHUM LONCHITIS.

The arrival of a genuine example of this species from Scotland gave opportunity for complete notes on this genus, which is taken next as the two more common species bear a superficial resemblance to some *Lastreas*.

The scale is small, isosceles shaped, the base broad and cordate or excavate (heart-shaped or hollowed out), the apex varying in acuteness but not tapering to the extremely thin point seen in some *Lastreas*; the margin is rough with a fringe, the projections sometimes being practically uniform in length and so presenting a "saw-edge" appearance, at other times being more uneven, and occasionally hooked at the tip. No glands were seen, but there are brown granular masses on the scale surface.

The veins throughout are moderately wide apart and thick, dark red at the centre, yellowish towards the margin where they are usually undulating or curved; at the centre above the middle of the scale they tend to form a stripe; the "meshes" are rather long, but variable and there is a tendency to greater length at the scale-centre above the middle, and at the base they are often short and square, seemingly formed of very thick veins which on close inspection reveal a composite character as in *Lastrea dilatata.* The veins generally appear to be in two layers, and some of the " meshes " contain chlorophyll ; the general effect of the various details produces an impression of compactness.

POLYSTICHUM ACULEATUM.

The scale varies in form, being sometimes narrowly-isosceles in shape, at other times almost equally broad throughout, but the apex is, typically, very long and narrow, the base being nearly straight, and the margin very ragged throughout with variable projections which are mostly short, wide and blunt at the point, this being sometimes forked : no glands were seen, but loose brown granules on the surface.

The veins are yellowish in colour, deepening to a light red-brown, very thin and much bent, rather long from junction to junction, uniting in irregular ways, and apparently forming two layers ; near together, forming narrow " meshes " and crossing one another ; at margin more bent and curved than in *Polystichum angulare*, but not forming real " swirls " of *Lastrea* type : on some of the basal veins minute projections were seen like tiny red spines, which seemed to spring from the actual vein surface, but are so small that they are noted merely as curiosities.

POLYSTICHUM ANGULARE.

Two gatherings from different localities were used, and as the differences were unimportant no other material was selected. The colouration was the main distinction, one set being a light brown and the other a dull lead hue : the general vein and surface tint is yellowish.

But there is much variation between scales *from the same plant* : the base may be either cordate or straight, while the apex is long, and narrowed to an acute thin point : the margin is ragged but usually less so than in *P. aculeatum*, the projections being less crowded, and fewer towards the base ; but equally as long, and in some scales taking a needle-shape and then occurring lower than usual. No marginal glands were seen.

The veins are thicker and straighter than in the other two *Polystichums* ; thc " meshes " vary in length and width, more often being rather narrow, but sometimes wide and then often very sinuous, giving, as a result of this marked variation, a sense of instability about the scale's intentions, corresponding to the fern's inclination to break loose at any moment from the normal.

At the margin the veins may resemble the *aculeatum* form, but more often the " meshes " there are straight and very narrow for two or three rows, forming almost a definite pale band : at the base they are short, especially at the centre.

Dr. Stansfield suggested in the June GAZETTE that a connection may be made between *Lastrea* and *Phegopteris* through *L. montana* : there does not seem to be evidence of this through scales, but notes on the four former *Polypodies* are given.

POLYPODIUM DRYOPTERIS.

Mature scales were first examined and showed a straight base and an even width to near the apex which narrowed suddenly to a long very thin point, almost veinless, " vertebral " (i.e. composed of a number of jointed sections) and brown from granular masses filling it : these and round or square chlorophyll granules are also found on the surface elsewhere. Along the margin there are globular sessile glands, rarely stalked with granular head ; and occasionally minute projections occur consisting simply of a short broad stem which now and then bears a chlorophyllose branch. As in other cases, there appear to be surface glands ; the texture is thin and the scales are deciduous.

The veins are thin and wide apart, " meshes " not uniform in shape but roughly short near the base, longer above, especially at the margin and then short at the apex.

Immature scales bear pin-shaped and column-like glands, the latter being more common near the base. At the vein junctions "crow's foot" wrinkles occur, and there are thin translucent veinlets traversing the "meshes."

POLYPODIUM PHEGOPTERIS.

In this case immature, or perhaps one should say fresh and unweathered, scales were taken first and found to be isosceles in shape with a straight base and a long, thin, vertebral apex, the point almost veinless, the base with four or five rows of honeycomb-like "meshes" which become narrower above and towards apex much elongated and narrow. The veins are thin throughout with fewer "crow's foot" wrinkles and transverse veinlets than in *P. dryopteris*. The marginal glands are irregular in form, but approach the pin-shape and occasionally the columnar, while some are cone-shaped. More important are the long, needle-like projections, veinless, easily broken off, occurring all along the margin. Nothing quite like them has been seen yet on other species.

The colour of the scales is a light brown in patches; there are occasional hairs, square chlorophyll granules and a few small "cottage-loaf" bodies of the type seen in *Lastreas*.

Older scales are brown throughout, the base slightly excavate, or curved with a *colourless* "inset" of almost square "meshes" at the centre. The apex very long and narrow, glands absent or sessile and very small, and the needle-projections persistent and therefore, though easily removed, apparently not truly deciduous.

POLYPODIUM CALCAREUM.

Fronds of this were obtained from a limestone scree in Derbyshire, rather late in the year to get new scales, but a few were secured and proved similar to older ones, which are small, the base excavate or very cordate with basal "wings" (each side of the hollow) curving strongly inwards and almost touching one another. There was no fringe as in *P. phegopteris*, but columnar, pin- and club-shaped glands are frequent. The scale is narrowed gradually at first, then rather suddenly to a long, narrow, vertebral and almost veinless apex, the veins being fairly thick throughout.

There appear to be two types of scale: one, of a light brown colour having the veins wide part and " meshes " rather long except near the base, where some are shorter ; and these are more uniform than the remainder, which are very irregular : in the other type the colour is leaden, the veins are close and the " meshes " shorter and at the base small, oval or square and very crowded, resembling in these points the " meshing " of *Polypodium vulgare.* This is all the more noticeable as such veining has not been noticed otherwise, and in both ferns the veins (of the scales) appear to be in two layers.

POLYPODIUM VULGARE.

In this the scales have a straight base usually, the margin fringed with irregular, rather short, blunt projections and, apparently, no glands. The apex is vertebral, very long and narrow. The veins are fairly stout and seem to be in two layers. The " meshes " are very irregular in shape and formation, almost like a maze, near the base (as has been already mentioned under *P. calcareum*) they are short and oval, and like that species longer above, but differing in greater width.

There are not many other ferns which might cause confusion by resemblance to one another. *Cystopteris fragilis* and *C. regia*, *Asplenium septentrionale* and *A. germanicum*, and *Asplenium Adiantum-nigrum* and *A. lanceolatum* are the most prominent, and of these only the last two are at all likely to give trouble owing to the rarity of three out of the remaining four. Young fresh scales from not fully developed fronds were selected from both *A. Adiantum-nigrum* (which to save space is numbered 1) and *A. lanceolatum* (numbered 2) ; and the following description is by comparison between them.

ASPLENIUM ADIANTUM-NIGRUM (1) *and LANCEOLATUM* (2).

The scales of both species are long, narrow, tapering to a fine point, which in (2) is rather shorter and possibly a little less acute than in (1). The base of the scale in both is straight or only very slightly curved, and the margin has a few rather long curved protuberances into which a vein usually projects, and in the case of (2) does so further towards the protuberance-point than in (1). No glands were seen in either species The scale-tissue has in it thin colourless veins either in the form of lines or appearing as insets to the " meshes " formed by the thicker veins dealt with hereafter, these thin veins being more evident and frequent in (2) than in (1). The thicker veins alluded to are the most noticeable features of the scales, and appear to be on the surface and to stand out with an almost stereoscopic effect, particularly noticeable in (2), in which they are stouter and darker than in (1), of a deep brown as contrasted with a clearer red-brown tint. At the apex they merge into a single vein, with lateral spurs longer in (2) than (1). The " meshes " lower in the scale are of varying form, but never very long and usually wide. The connections at the top and bottom of each " mesh " are shorter in (2) than in (1), and in (2) are *straight* as a rule, while in (1) they are usually distinctly *curved*. This last point is specially notable and is perhaps the most distinctive difference between the species and one that is easily seen on account of the prominence of the veins.

E. A. ELLIOT.

A NOTE ON ASPLENIUM LANCEOLATUM.

In the GAZETTE for June, 1928, mention was made of a " find " of this on a Devonshire cliff. The record is an old one for that locality ; but at the time it was confirmed, some doubt was thrown on the genuineness of the plant as *Asplenium lanceolatum*, and although my diagnosis was worked out by reference to Lowe and borne out by Kew, there has always been a shadow of uncertainty. So when staying again in Devon in June, 1931, a visit was paid to the spot and a number of fronds secured in torrential rain, several were sent to Dr. Stansfield, who divided them into *A. lanceolatum* and *A. adiantum-nigrum*, and doubts exist no longer.

The habitat in fact of the two plants is quite distinct even when growing close together ; as *A. lanceolatum* seemed to be confined to crevices in rocks, or small gullies between one rock and another, or ledges under overhanging rock-faces where a small amount of soil had collected. *A. Adiantum-nigrum*, on the contrary, grew at or near the rock-base, but in the ground proper ; if found on a rock it was near the top where a fair amount of soil lay, no doubt washed down from a higher level. Another point far more noticeable than many usually referred to in descriptions is that the pinnæ of *A. lanceolatum* extend almost or quite to the base of the stem, so that there is hardly any stipes in the proper sense, just as in the case of *Lastrea montana*. Dr. Stansfield, in a letter about the fern, alludes to this, but the books do not appear to notice it. With *A. Adiantum-nigrum* the stipes is long and quite bare. The ordinary distinction made between the two lowest pairs of pinnæ is not always obvious enough to be reliable, though it is true that in some fronds of *lanceolatum* the lowest pair is shorter than the pair above, whereas in *Adiantum-nigrum* the lowest pair is always the longest. But the downward extension of pinnae confuses this point frequently, while it will often be found that several of the lowest pinnæ are defective and so worthless as a test.

This Devonshire locality is exposed to wind, rain and sun, which may account for the extremely curled character of the fronds collected from *lanceolatum*, the frond curving so that the tip almost touches the root-stock, while the pinnæ are of the *revolvens* type, the whole frond being stiff and wiry and *brittle*. Dr. Rowlands, however, has noticed the same thing, though not to quite such a marked extent, but sufficiently so to present a contrast between the feathery spreading fronds of *Adiantum-nigrum* and its ally, which probably never attains such length of stipes and will be found duller, not glossy, in appearance.

E. A. ELLIOT.

BRITISH FERNS ABROAD.

It is with a certain degree of shame that the writer, who claims to be an enthusiastic member of the British Pteridological Society, has to admit that he has done his fern-hunting this year in Switzerland, however much for other reasons that fair land may be entitled to his affections. But the defined objects of the Society do not exclude the study of British fern species abroad : some of our most able and valued members reside in other countries and we set considerable store on our international connexions. In any case, it affords some satisfaction to British fern-lovers to know that there is a reserve abroad of some of their rare and almost extinct species and that, on the other hand, they possess in Britain a relatively bountiful share of species like *Polystichum angulare*, among which it is most worth while to search for varieties.

The following brief notes of a week or two's hunting in Switzerland must not be taken as indicative of what is to be found in Switzerland generally. They relate solely to a perfunctory examination of limestone mountains in the Oberland at heights ranging from 3,000 feet to 8,000 feet. Of *Polystichum angulare* none was seen ; of *P. aculeatum* a few specimens only, on shady damp wooded slopes. *Polypodium vulgare* was rare and *Lastrea filix-mas* by no means plentiful. There was very little *Asplenium trichomanes* or *A. Ruta muraria*, but *A. viride* was plentiful at varying elevations. This little fern afforded the only variety seen during the whole period and this variety was found at a height of 7,000 feet, growing in a crack on the top of a rock in exposed scree upon which, however, were growing with it many plants of *Cystopteris alpina*, as well as various alpine flowers. The several plants of *viride* at this spot were dwarfed and yellowish, as well they might be having regard to their exposure (except when covered by snow in winter) to every sort of hardship from icy winds to baking sun. They could hardly have existed at all under such adverse circumstances at lower elevations. Upon the same extensive and interesting

Alp, but lower down, *Botrychium lunaria* was growing in grassy places close to a splashing torrent. In all the places visited *Cystopteris alpina* was growing among rocks from about 6,000 feet upwards, much as *Allosorus* grows among non-limestone rocks in the North of England. The conclusion was reached from examination of a large number of specimens that this species is very variable, ranging towards the form which Dr. Stansfield describes as *dissecta* in one direction and towards and beyond his form *obtusa* in the other. *C. alpina* was not observed below about 6,000 feet, and if any plants are to be found in the same region much below this level they have probably been brought down from above by the violence of nature, as is frequently the case in the alpine flowers. But apparently in the neighbourhood of the Lake of Geneva this fern is found at a lower altitude and is more usually of the *dissecta* form. It was observed that *Cystopteris fragilis*, common enough lower down, did not grow much above 6,000 feet, where it overlapped *C. alpina* and simulated the fresh green of that species to such an extent that its presence was a cause of confusion in the hunting of *alpina*. *C. fragilis* at low elevations is often very finely divided and sometimes of an almost glaucous hue, and it seems evident that altitude has a considerable effect on the appearance of both *fragilis* and *alpina* ; but a good deal more research than the writer is likely to be able to give to the subject would be necessary to prove this theory. The other member of the *Cystopteris* family was seen in one place only. Here *C. montana* was growing, at an elevation of about 5,000 feet, with *P. dryopteris*, in deep and loose leaf mould and moss under the high shade of tall spruces on a somewhat steep slope. *Dryopteris* was very gross and *C. montana* was so nearly of the same size and general appearance that it was at first mistaken for a variety of *Dryopteris*. It is hardly conceivable that these conditions of growth are not ideal for *C. montana*, and in that case if in its British station on Scottish mountains it is correctly described as growing on "moist ledges of rocks," its disappearance, if it still exists, is probably only a question of time. Near these two species of ferns was growing that flower beloved of botanists, *Pyrola uniflora*. It was too late in the year to see it in bloom, but the foliage was subsequently discovered in three or four other places at long distances apart. *Lastrea rigida* did not appear to be at all plentiful ; but although there were extensive tracts of limestone debris no home so suitable for this fern appeared to be available as the limestone "pavements" of northern England. The position is reversed in the case of *Polystichum lonchitis*. That fern, which grows so sparingly in Britain, was in great abundance on broken slopes at about 6,000 feet. In one instance, over a considerable area, it was seen with fronds averaging nearly 2 feet long growing in quantity, roughly estimated at one to the square yard. This was a cheering sight for one who has spent hours in England to find but a single specimen. No time could be spared for a prolonged search for a variety, but so far as could be seen, this fern fully maintained its British reputation for constancy.

P. GREENFIELD.

NEW "FIND" IN ASPLENIUM VIRIDE.

Mr. P. Greenfield, in his account of "British Ferns Abroad" in the present number, makes only casual mention of a variety of *A. viride* found by him in Switzerland. The fern in question is, however, a very important "find"—the best variety found wild for many years, perhaps even in this century. It is really a *plumose* form of *viride*, similar and equal to the *incisum* forms of *trichomanes* which are really the analogues of *plumosum* in other species. Not only is it the best variety of *viride* known, but it is practically the only one at present in cultivation, the other so-called varieties being indefinite and inconstant forms of *multifidum* and *serratum*, differing but little from the normal type and reverting to it upon the smallest, or without any, provocation. It is true that there is a record in Lowe's "Our Native Ferns" of the finding, on Whitbarrow by Mr. James Huddart in 1853, of a variety which is described as having "pinnæ deeply incised in the manner of *Asplenium trichomanes incisum.*" It was named *bipinnatum* by Mr. Clowes, of Windermere, into whose possession it passed. Unfortunately, no specimen, or even figure, of this fern is known to exist and there is no one now living who ever saw it. The name *bipinnatum* would not describe Mr. Greenfield's "find." The latter is incised to the midrib after the manner of the best *incisums* in *trichomanes*, but the segments are not separated into pinnules as in Ellis Roberts's *A. trichomanes bipinnatum*, in which the pinnæ are really miniatures of the normal fronds of the species. Finally, the new fern is barren, as in the best *plumosums* of most species. This latter character, although it is a serious bar to propagation and will prevent it from being widely distributed for many years, is not without its compensations inasmuch as the plant will not be liable to spore itself to death as many of the fertile forms of *trichomanes* often do, and as even the normal type of *viride* has been known to do under cultivation. The new fern at present is a very small scrap indeed, but will be well cared for and we hope, after a year or so of cultivation, to give a photograph of it in the GAZETTE. Those experts who have seen it have been enthusiastic in their admiration of its beauty and distinctness of character.

F.W.S.

ON "FINDS" IN GENERAL.

It is a noteworthy fact that during the past few years a number of "finds" have been made, in several branches of natural history, which are quite equal to any recorded in former days, but since each branch is now specialized and disconnected from the rest, the total importance of such discoveries is not readily available to those interested. The writer happening to have had a hand in some of them, thinks that they are worth reporting, though, of course, each has its special medium. For instance, a few years ago two coleopterists set out to rediscover a beetle which is fairly common on shingly beaches, but had also been recorded some seventy years before from an inland valley in the Midlands.

When they (taking me with them) had found a large pebbly area, success was soon assured. In this case, resemblance in fern things would be secured by the discovery of *Lastrea cristata* in one of its formerly-recorded localities, and why not? for one of the coleopterists referred to spent several days once at intervals hunting a beetle in a spot where it had not been seen for half a century or so, to be rewarded, after many failures, with eventual success. "Finds" are such peculiar events. On the former occasion as we walked up the valley and stopped to examine alder trees, a rare beetle hardly known to either coleopterist settled on the shoulder of one and was picked off almost as a matter of routine by the other, who did not immediately realize what it was. More recently I was going through a wood with a fungus expert when he discovered an entirely new British species, not far from where two or three years before he found a species hitherto unknown. Neither of these was particularly small and he has scoured the wood scores and even hundreds of times, as also another wood we visited where I discovered a really large fungus, which proved to be a new County record : and the year before another county provided an entirely new species. Still more recently several bryologists planned a hunt for a rare moss, and only a few days before the successful expedition took place one of them found it in another locality that he had worked over previously for many years.

To come to our own special interest in ferns, fresh records are being made to-day that rank with the best. Our Editor keeps us informed of them and their exact value. Perhaps the time is past when all-inclusive British Natural Histories will be compiled, but the same work is going on and our own is still full of the same opportunities and bears comparison as it always has done with the rest.

E. A. ELLIOT.

ARTIFICIALITY IN FERN GROWING.

Here and there, dotted about the face of the earth, perfect Ferneries are to be found ; places in which the natural habitats of the plants cultivated are so closely imitated that the occupants adopt them to the extent of reproducing themselves by sporelings or by spreading out as if truly wild : and yet even these perfect constructions are artificial, at any rate in the case of many of their inhabitants, when species of varying likes and dislikes are grown together. Ferns, however, have a way of confounding a definition of this kind by electing to establish themselves in unlikely and unnatural spots, and then the definition of artificiality has to be altered to " making them grow where they don't want to."

It is just that extreme that one wants to avoid, by accepting the fern's own readiness for an unusual but otherwise suitable home and by trying to introduce some natural elements into it ; for, after all, it is not normal to have a dozen or more species close together in a space measuring 20 by 10 feet especially when such diverse kinds are included as *Scolopendrium*, *Athyrium*, *Cystopteris fragilis*, *Lastrea æmula*, *L. propinqua* and *Polystichums*, with an *Osmunda* on the edge and oak and beech ferns as well. However, it will probably be found that even in the unnatural sameness of such quarters the ferns mentioned and several others will grow and thrive, cheered on by the palliative of shade, wind-breaks and a handful or two of good compost when planting is done, or of some top-dressing.

The real problem comes with the lime-haters, when one's garden is limestone, or the thirsty when it is dry, or the woodland lovers when local leaf-mould is saturated with lime, or, in short, those species that need special attention. *Lastrea montana* is one, *Blechnum* another, and then there are some *Aspleniums*, not to speak of the rarities such as *Lastrea cristata*, *Cystopteris montana*, *Woodsias*, and so on.

Allosorus crispus has been one of my most persistent failures, though every effort has been made to start it in moist but sunny places with a stone on the root-stock—this in itself is asking for trouble as the stone harbours slugs by day, which have only a few inches to crawl at night to reach and enjoy the fronds. Some years ago a wonderful bed of this very lovely plant was seen, composed almost entirely of leaf-soil ; well-decayed leaves mixed with soil (in this instance clayey), but real old stuff undisturbed for years. In this *Allosorus* grew and spread rampantly, sending up to 6- to 8-inch fronds, and the hint was at last taken, a clump of the fern, half a sack of the soil, and, as an extra, a pound or so of flint fowl grit, being put together into a deep hole in a sunny flat border below the Fernery. Result, after a longer trial than ever before, complete success : the fronds became rather yellow till well soaked by rain and some are withering off rather early, but not one has been seen slug-eaten, and new fronds are pushing up strongly though it is expected that they will be shorter for a time. Then there is *Blechnum*, about which one is rather shy of writing as most people seem to have no trouble with it, but my failures have been many, and trying, as it is a favourite with me. Two methods are being tried with this : one to be mentioned later, and the other a commonplace one, that of growing the plant in almost pure leaf-mould from a clay district in big oblong earthenware seed-pans, sunk in a flat bed of leaf-mould. The fern seems to like the compression so caused and does better than when planted outside the pan in the looser compost. *Lastrea thelypteris* (the crested variety) is doing nicely treated in the same way. *Cystopteris montana*, which came as a kind and welcome gift, is liable to suffer from a peculiar and rather local trouble most pronounced where slugs abound : the creeping root-stock, when first planted, has so little hold on the soil that every insect-hunting bird pulls up each scrap of root every time the soil is searched for food. In fact, it is probably some insect that haunts the plant rather than slugs. The only remedy is to pin the roots down and cover the whole thing with wire netting raised some inches from the ground.

Another difficulty of mine has been *Lastrea montana*, which appears to need constant moisture draining past the root, as may be seen by many roadsides in North Wales, but which did not offer a solution until specimens were seen in equally wet, well-drained, but otherwise different situations on Dartmoor, the difference consisting in the close proximity of *Sphagnum*. This has gone to form a lot of the Dartmoor subsoil and suggested an idea which may not be new but is the height of artificiality. A look round an ironmonger's shop, during a shopping call, disclosed wire frying-baskets, the wire handles of which can be filed off, leaving a short, innocuous stump, and the whole basket, on arrival at home, was filled with a layer of *Sphagnum* round the sides and a compressed heap in the centre. On this a small amount of best soil is laid, the plant's roots spread out on this and sufficient to cover and hold it up pressed down on top of them : the *Sphagnum* being first well soaked. After this the basket is hung up, if outdoors, by a very short wire to prevent swinging, and a soak once or twice a week is easily managed by lowering the whole affair into a pail of rain-water. If the basket is allowed to drip and run its superfluous water off into the pail, this will last a considerable time.

Besides *L. montana*, this is the other method in use with *Blechnum*, so far with surprising success, the plants so treated having begun after a fortnight or so to send up new fronds, though that habit is no doubt usual after a replanting occurs.

Blechnum, however, is apparently rather slow as a rule in this, and a note of some interest might be made as to the difference in this matter (of new frond production) between one species and another : *Lastreas* seem to be amongst the most rapid, *Aspleniums* rather slow. As well as *Blechnum*, *Asplenium lanceolatum* and *A. fontanum* are being basketed, the former taking rather unwillingly to any change of home, but the latter doing far better in this way, in an outhouse (window always open) than in a pot in open ground. I may venture to try one *L. cristata* like this later on ; at present mine are but seedlings in peaty, leafy soil in tiny pots sunk in the *Blechnum* pan and growing fast.

E. A. ELLIOT.

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Stansfield, Dr. T., 120, Oxford Road, Reading.
Stansfield, Miss Jessie, Broad Road, Sale, near Manchester.
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THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

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VOL. VI. No. 6.

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

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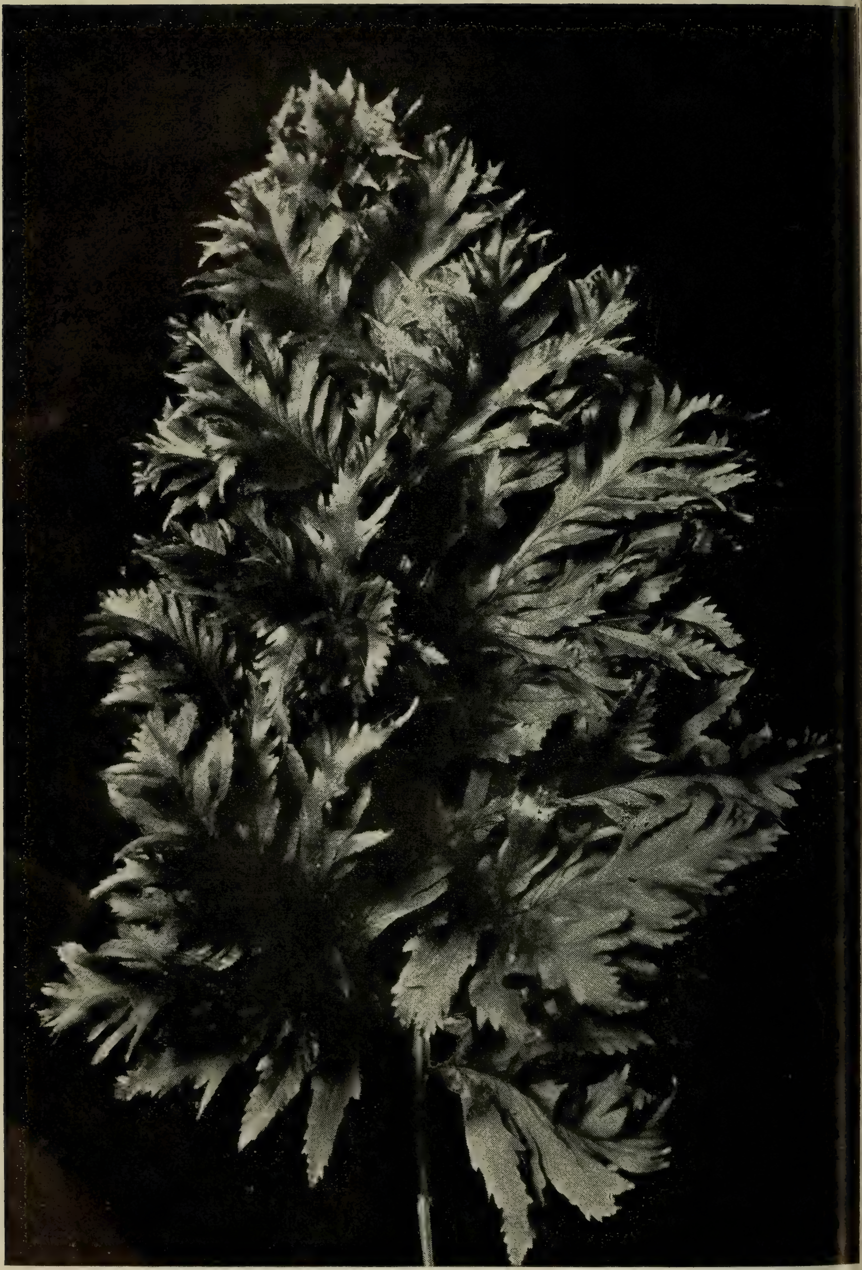

Polypodium v. Cambricum Barrowii.

THE
BRITISH FERN GAZETTE.
NEW SERIES.

Vol. VI. JUNE, 1932. No. 6

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EDITORIAL NOTES.

Our Vice-President, Mr. T. B. Blow, F.L.S., has recently communicated a second paper to the Linnean Society on the subject of the alleged larvicidal properties of *Chara fragilis*. He has been working for some years on the *Characeæ* and has previously contributed a paper which was noticed in our Editorial Notes in the Gazette, Vol. V, No. 12. Mr. Blow considers his second paper to be decisive (in a negative sense) on the question examined. With his permission we are publishing his paper in our present issue Although the members of the genus *Chara* are not ferns they are fern allies like the *Lycopodiums* and *Selaginellas* and have been often alluded to, and sometimes described, in the older books on ferns.

We have received, from Mr. F. W. Thorrington, fronds of a seedling *Osmunda* which he has raised from spores of *O.*

JUL 5 1932

regalis cristata and which seems a distinct break from that well-known and favourite variety. Although the plant was raised ten years ago it is still small and has, so far, produced neither offsets nor spores. It is much more thoroughly crested than the parent usually is at the same stage of development and seems likely to be a *percristata* since not only the pinnae and pinnules but even the pinnulets are crested, while the fact that there *are* pinnulets indicates a tendency towards an incised, if not even a plumose, character. If it can be persuaded to grow to anything like the size of the species while retaining its thoroughness of character, this should be a very striking and beautiful variety. We hope to see it again after a year or two of further growth.

Our friend, M. Paul Kestner, says he has carefully examined microscopically many plants of *Asplenium Germanicum*, but has never yet come across a perfect spore. This experience seems to explain our own lack of success in raising sporelings of this fern which has, so far, been complete. We have not made any microscopical examination of the apparent spores, but propose to do so this year should any be available. Fern spores, by the way, seem to be very late in germinating this year, here at any rate. Those sown in the winter or late autumn usually show incipient prothallia about March, but this year the only ones showing growth at all at the end of April are those of *Lastrea pseudo-mas incisa* brought from Whitewell last year. All the rest, which include *montanas*, *Polystichums*, *Aspleniums* and *Blechnums*, if alive, are still completely dormant.

The Treasurer, Mr. J. J. Sheldon, will be glad to receive any outstanding subscriptions.

OUR FRONTISPIECE.

Polypodium v. Cambricum Barrowii.

The figure is a reproduction of a photograph from a plant in the collection of Mr. T. E. Henwood. The original plant was found in Westmorland in 1874 by Mr. Thomas Barrow, of Lindale. It is certainly one of the very finest forms of the species, being only rivalled by *plumosum*, Whilharris, and it is a moot point which of the two is the more beautiful thing. The slender pointed tips of the ultimate segments are translucent and would probably develop apospory under suitable conditions. As such conditions would necessitate close culture, however, and a saturated atmosphere, which would be unfavourable to the health of the plant, most growers prefer to let the apospory slide and to have a healthy and beautiful plant. It is singular that three of the finest forms of "Cambricum," viz., *Barrowii*, *Hadwinii* and *Prestonii* have all been found outside the principality in Northern England. The origin of Whilharris is at present unknown. Any reader who can throw light upon its history will be a benefactor to the cult of ferns.

OBITUARY : DRUCE.

We regret to announce the loss of a valued friend and an honorary member of the Society, viz., Dr. G. C. Druce, M.A., F.R.S., F.L.S., who died on February 29th, at Oxford. He was a very keen and critical botanist and the author of "Floras" of the counties of Oxford, Berks, Bucks and Northampton, besides many contributions to the proceedings of the Linnean and other learned societies. He believed he had found wild every known British flowering plant and fern. He was not a fern specialist, but as a general botanist was well acquainted with all the species. He contributed to our columns (Vol. IV, p. 182, etc.) a paper on the Nomenclature of British Ferns, embodying the results (in this section) of the Vienna Conference on botanical nomenclature. This paper is valuable for reference, giving as it does all the most modern, as well as the most ancient, names of our British ferns. Dr. Druce had a serious attack of illness in the early part of 1931 which sapped his vitality at his then age of 80, although he recovered sufficiently to pay a botanical visit to the Levant where he collected some curious geographical types of *Dryopteris filix-mas*. He retained his keen intellect to the end of his life. His funeral was attended by a large number of friends and by representatives of the city and University of Oxford and of the numerous societies of which he was a member. He was a most genial and vivacious companion and we have vivid recollections of many "great days" with him on botanical expeditions in the counties of Oxford, Berks, Hants and Bucks during the last forty years. Peace to his ashes.

F.W.S.

DIFFICULTIES IN FERN GROWING.

The Rev. E. A. Elliott's interesting article on "making" as he says "Ferns grow where they don't want to," reveals troubles with which we are all more or less afflicted. I think the alpines present the greatest problem of all. To anyone living in a manufacturing area the difficulty becomes acute. Under such circumstances a greenhouse becomes a necessity. Light and air, and plenty of them, are the main factors of success, especially the light—a great deal more so than many think. Get them well up near to the glass. In time past I used to have a kind of long trough, fixed high up, running almost the length of the greenhouse and with sides about 3 inches deep. The *Woodsias* grew finely on that shelf, in fact most of the alpines did so. If any of the other species showed signs of failing, when they were placed upon that shelf for a period it usually worked wonders. On one occasion I raised a nice little crop of *Woodsia Ilvensis* from spores and that within five miles of Manchester. About thirty years ago I managed to get a plant of *Cystopteris alpina*; it was rather small and I never managed to get it going and it soon perished. I hope to do better with the plant of the same species which our Editor has so kindly sent on. *Cystopteris montana* (one of my favourites) never gave me any trouble. It is one of the most beautiful of ferns—a very early riser, always about the first harbinger of spring among the fern tribe, and one of the first to start hibernating for winter, which it usually does in August—sometimes earlier—and it seldom, if ever, sends up a second growth in one season.

My method of dealing with *montana* is to select a good sized pot, say 8 or 10 inches across (a deep pan would do as well), three parts fill it with crocks, cover them with a thin layer of leaf-mould, then about one inch of compost ; spread the rhizomes out on this and cover with about another inch of compost ; keep the soil on the wet side if anything. The rhizomes soon begin to burrow among the crocks and the fern—well ! it simply revels. It has always done better with me treated in this way than if planted in a bed and allowed to run loose. The members of the *Cystopteris* family are usually credited with being lime lovers, but I think *montana* is an exception to that rule. I have been told, and have proved from experience, that it likes some peat in its compost. The late Mr. C. T. Druery, writing (in one of the early GAZETTES, if my memory serves) on *Allosorus crispus* and the difficulty of growing it, said " plant it in some corner in the open (with a suitable compost of course) ; then throw a spadeful of gravel on the top and forget it." I have never tried this method, but propose doing so as time serves. I fancy *Allosorus* does best with a north aspect. In the Lake district, its true home, one mostly finds it growing in a kind of turfy loam with a good admixture of slaty grit. It seems to root rather deeply and a grandfather specimen takes a lot of digging up. Of all the British species I regard *Asplenium viride* as the most troublesome fern to rear. I have tried all the dodges I could think of, but it has always beaten me. It is strange when one considers the similarity (outwardly, at least) between *A. trichomanes* and *A. viride*, but it seems to me that all similarity vanishes when it comes to the growing part. Here I have *A. trichomanes*, with fronds a foot long, growing in a frame with *A. trichomanes cristatum* and *A.t. Italicum* (*foliosum*, Cowan Ed.), but the latter has never made much headway. Most of our British *Aspleniums* need very careful nursing. Too much of the watering can, or too little, soon brings trouble, and, once the backward trend sets in, it is very difficult to arrest it. Of the *Lastreas* (I suppose I ought to write *Dryopteris*, but I don't like this new classification) that delightful product of our Northern hills, *L. rigida*, is, in my hands, a difficult customer to deal with. I have had many specimens from time to time, but I must confess that I never succeeded in keeping one alive for very long. It flatters one's efforts for a short time and then each successive crop of fronds gets gradually smaller until it finally winks out altogether. There is, I feel sure, a need for more information on how to handle these difficult ferns and as our friend, Mr. Elliot, so aptly puts it, " make them grow where they don't want to grow."

J. W. S. BIGLAND
(Bebington, near Birkenhead).

[Mr. Bigland's difficulties are as interesting as, if not more so than, many records of successes, since the latter are frequently the result of naturally favourable circumstances. With regard to the Parsley Fern, Mr. Henwood has a plant which he brought from Snowdon in 1910, since which time it has only been repotted once. It is still a flourishing plant although growing in a pot and only protected by a light frame which is open during the summer and autumn. *Asplenium viride* is generally reckoned a rather difficult subject and we have lost plants from time to time without being able to find out why they died. On the other hand, two plants, evidently recently collected wild, were received a couple of years ago from Mr. Oliver, of Melrose. They rapidly established themselves and are now as fine examples as could be desired, the fronds of last year being still (middle of April) fresh, green and beautiful, and the plants breaking into vigorous growth. These have been grown on a shelf similar to Mr. Bigland's, but in pots, being planted in a moraine mixture of equal parts of loam, peat and broken limestone. They have been watered from below, on moraine principles, by their pots being stood in a dish of water for an hour or so when approaching dryness and then removed and allowed to drain. They are never allowed to stand in water for a long time, and a surfacing of broken limestone prevents any growth of moss or liverwort on the surface of the soil which consequently never becomes sour or waterlogged. We have never had any great difficulty with *Lastrea rigida*, though we have occasionally lost plants from accident or lack of reasonable care. Probably the same treatment which suits *viride* would also suit *rigida*. A plant brought from Ingleborough in 1929 has become well established and still looks all right, although rather backward in starting into growth this season.—*Ed.*]

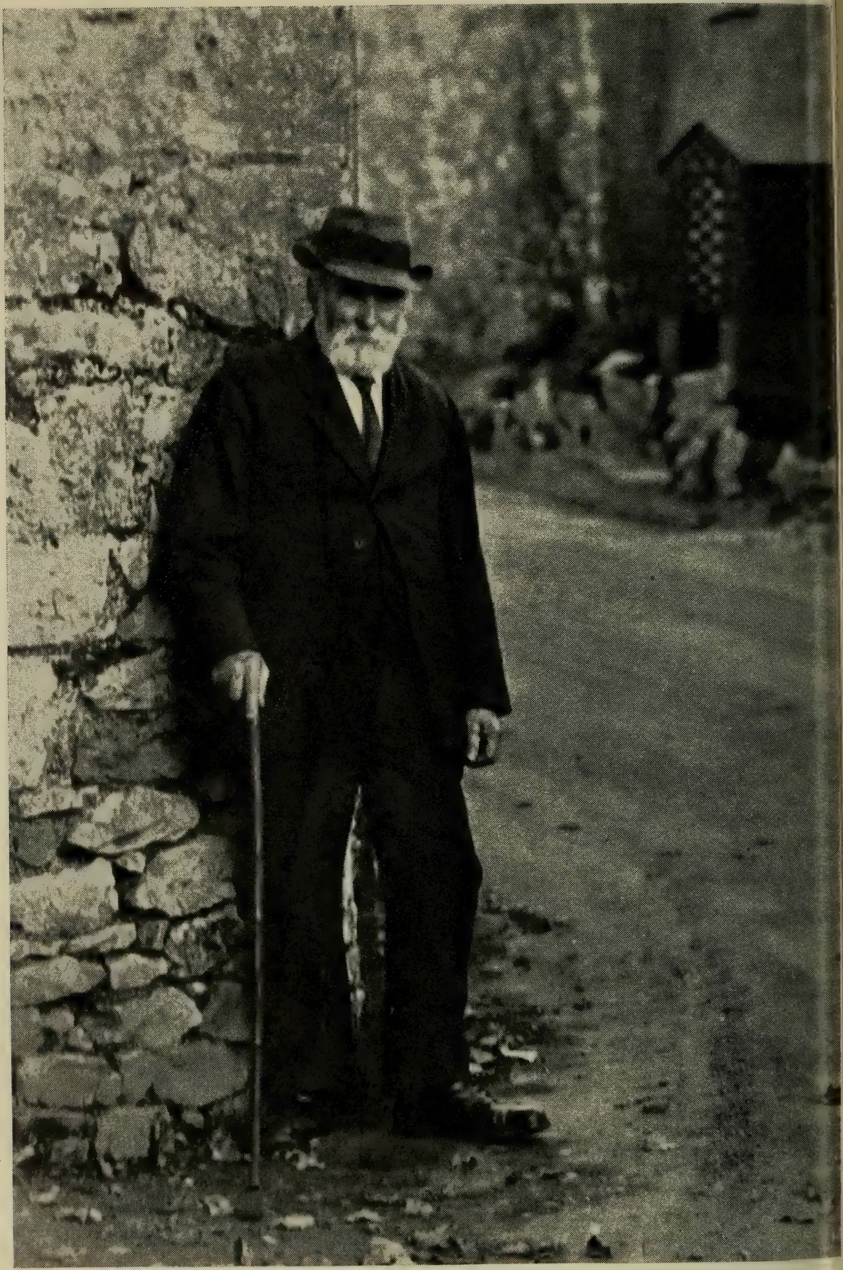

Photo by] [Samuel Thompson, Lancaster.

Henry Bolton of Stony Croft, Warton, nr. Lancaster.

MR. HENRY BOLTON, STONY CROFT, WARTON.

I think no one will dispute my statement when I say that the subject of this article has had a longer association with hardy British ferns than any other man living. Mr. Henry Bolton is, in his 85th year, still hale and hearty—may he long remain so. He was born, and has lived, I believe, all his life, about seven miles north of Lancaster in the picturesque old village of Warton. With this village George Washington, the first president of the United States of America, was associated in his early life. Mr. Bolton tells how he first became interested in ferns. This was at the age of nine years ; he was in one of the beautiful lanes under the shelter of Warton Crag one Saturday afternoon when he came across a schoolmaster from the neighbouring town—a fern enthusiast. This man had just found what was, to him, a new fern ; he pointed out its beauties to the boy and told him what grand ferns were to be found in the district and advised him to go hunting for some. Bolton became interested, then enthusiastic and from that day, 76 years back, to this, ferns have been his great hobby ; he is as enthusiastic over them to-day as he was when I first met him—years ago.

R. Whiteside.

THE ANNUAL MEETING, 1932.

The General Meeting of the Society will be held at the Prince of Wales Hotel, Lord Street, Southport, at 10 a.m. on August 25th, the second day of the Show. As the Corporation is again offering liberal prizes for exhibits of British and other ferns, the Southport Show affords a unique opportunity for lovers of these plants to see first-rate collections and groups from growers in all parts of the country.

The occasion of the Show will also, we hope, attract a large number of members to the Meeting of the Society. On the third day of the Show it is arranged that the members who can do so should pass on to Wrexham in the County of Denbigh, N. Wales, for a few days' fern hunting. The headquarters of the Society will be the Wynnstay Arms Hotel, Wrexham (Manager, Mr. F. H. Hope), where good accommodation is to be obtained and from which convenient access, by rail or omnibus, is available to all parts of the county. The proposed visit to Scotland, after the Meeting, had to be abandoned from lack of support. Denbighshire is said to be swarming with ferns and, although it is mostly non-calcareous, there are some outcrops of limestone to be met with, so that a fair number of species may be found. The county has been but little hunted for ferns so far as is known, but our member, Dr. Rowlands, gave an account of a visit to it in the GAZETTE (Vol. V, p. 151) which may be re-read by members with interest. Members who intend to join the party will be well advised to secure accommodation in advance and in good time.

FERNS IN THE SPRING OF 1932.

The present year has so far been rather a trying one for ferns. The mild weather of December and January tempted many things to start into growth before the proper time, while the persistent cold of February, March and April, gave them a strong though doubtless salutary check. Fortunately, it was not so cold here as actually to destroy the new growth and the position altogether is not so bad as in some previous years when the cold weather came later after a mild winter and a precocious start into growth. A curious example of triumph over difficulties is to be seen in our fernery. A plant of a seedling variegated *P. angulare pulcherrimum* grew well in June last, making a nice shuttlecock of fronds, and built up a healthy resting crown. Unfortunately, it began to throw up new fronds very slowly in October and these have continued to expand during the periods of mild weather until the middle of April when the fronds were about half developed. The plant is in a cold house into which frost easily penetrates and as frost would infallibly have destroyed the young fronds, the plant has been protected by sheets of paper on every night when frost was to be apprehended and, of course, all the time during spells of frosty weather. It has now (May 5th) almost completed the fronds which began to grow in October and really looks very well though still not quite out of the wood since the danger of sharp frost is not yet over. The ferns out of doors have only quite recently started into growth and some of them have not moved even yet. Two examples of precocity are the two "hardy" *Adiantums*, *A. flabellulatum* and *A. venustum*, Don, both from India. These started into growth about Christmas and have made growth at intervals, resting in the coldest weather. The new fronds have not been injured. They have both been grown in the same house with the *pulcherrimum* and have also been protected by covering on frosty nights, though less meticulously than the *Polystichum*. Mr. Henwood has them both doing well in a similar house. Two plants of *Cystopteris alpina*, received last summer from about 7,000 feet in the Alps, are both now (May 5th) in full frondage and very beautiful, while a plant of the same species, collected some years ago lower down and grown in the same house, is now only just beginning to move although well established and quite healthy. The plumose variety of *Asplenium viride* found by Mr. Greenfield in Switzerland last summer, as previously reported, and sent to me in August, has been a source of much anxiety although (possibly because) it has been watched and fussed over like a sick baby. On arrival it was planted in a mixture of loam, peat and broken oyster shells in a small pot, this being placed inside another and the second one inside a third so as to imitate, as far as possible, the conditions in a cleft of rock. As it almost immediately threw up two or three fronds I imagined it was making roots and confidently anticipated that it would rapidly become established. It was placed out of doors in a north aspect, while the weather was mild, and taken under cover in frosty weather, being protected by a bell glass during the prevalence of east winds so as to preserve the old fronds as long as possible. *Viride* is a tricky customer, however, and the old fronds gradually faded one by one (although pieces of them still remain more or less green even now) and about the middle of April as it looked very tired indeed, one day I got a scare and decided that "something must be done about it," so I turned it out of the pot and found the original roots all dead, but there was *just one* new living fibre. The dead roots were trimmed away and the fern replanted in the moraine mixture of loam, peat and limestone and replaced upon the fernery shelf. In a week or so one or two incipient fronds appeared, but they came on so slowly that I was very doubtful whether the plant would pull through. Now, however (early May) it is decidedly looking up and several new fronds are appearing, so I hope the corner has been turned. Possibly it might have come through all right if it had been left alone, but I am inclined to think that the removal of the dead roots and the application of fresh soil gave it a stimulus. Probably the best treatment (had it been possible) would have been to imitate its home conditions by burying the plant under a foot or two of snow from September to the end of April. This was, however, impracticable in our latitude and low altitude.

(*Later, June* 1*st*).—The plant has now sent up half a dozen fronds and others are showing and, although it is still very small, it is thought to be fairly convalescent.

F.W.S.

THE ALLEGED LARVICIDAL PROPERTY OF CHARA FRAGILIS.

(*Read before the Linnean Society*, 28th *April*, 1932.)

From the American Journal of Hygiene of March, 1928 (Vol. 7, No. 2), pp. 279 and 292, it appears that Messrs. Matheson & Hinman began a series of observations of *Chara fragilis* in connexion with Mosquitos in 1923, commenced the tests in 1925, printing the results in 1928.

Further tests were made by these gentlemen, the results being published in the American Journal of Tropical Medicine of July, 1929 (Vol. 9, No. 4). Without going into details of the very extensive tests applied, it may be stated that their conclusions were that " *Chara fragilis*, growing in still and running water aquaria of various kinds, prevented Mosquito breeding. In the presence of decay oviposition takes place, and larval development proceeds normally. If the plant recovers its vigorous growth the decay ceases, larval growth is inhibited, and oviposition does not take place."

These conclusions came as a great surprise to British investigators, who had used many species of Charophyta as tests (in my case six species). None of them however appeared to have tested *Chara fragilis*, though I had used, with negative results, *C. delicatula*, a very near relative of *C. fragilis*, of which some botanists regard it as a subspecies. Thanks to the kindness of Colonel Barnardiston, I obtained an ample supply of *Chara fragilis*, proper, and when it had grown vigorously in two of my large glass jars introduced larvae of *Culex pipiens* and *Theobaldia annulata*, and they enjoyed a vigorous life, between 80 and 90 per cent. assuming the winged state.

It will be remembered that Mr. Pal, in his paper on *Charophyta* of Burmah, read before the Society on the 22nd January, 1931, drew attention to the destruction of Mosquito larvae by predatory insects. I sent a copy of the abstract of Mr. Pal's paper to Dr. Hamlyn-Harris, the City Entomologist of Brisbane, Queensland, whom I have known for many years as a careful investigator of this subject, and of *Chara fragilis* in particular, and the following is a copy of a letter he sent to Mr. Pal :—

" Some little time ago Mr. T. B. Blow of Welwyn sent me your abstract on Burmese Charophyta, read before the Linnean Society of London, and I thought the following notes might interest you. Some recent experiments with *Chara fragilis* have interested me very much and have some bearing on the economic importance of your own investigation. Some time ago I instituted a number of experiments with jars containing :—(1) *Chara fragilis* growing normally and (2) *Chara fragilis* in the state of decomposition, (3) *Hydrilla* and *Ceratophyllum*, (4) *Nitella gelatinosa*. Though these jars were all situated within a few feet of one another, the extraordinary thing is that the first jar to be selected was a large earthenware vessel, containing about a gallon and a half of water, and a fine growth of *Chara fragilis*. The Mosquito to select it was *Aedes Argenteus* of which the first three pupæ hatched within a period of ten days. Then came a further surprise, *Culex fatigans* selected a glass jar containing a smaller quantity of water but a more luxuriant growth of *Chara fragilis* than was contained in any of them. Two egg rafts were laid on this water. Some hatched out into adults quite normally, but the greater majority of larvae fell a prey to, first of all, the attacks of the species of *Hydra* present in considerable numbers ; the young larvae could be seen quite distinctly inside the central cavity when viewed in certain lights : secondly, the remainder of the first egg raft was attacked by a species of *Saprolegnia* which killed off the larvae so attacked. None of the other jars, not even the controls, were selected. It does seem strange to think that these two jars should have been the only ones selected and in face of such facts how can I possibly accept Matheson & Hinman's statement that ' under every condition *Chara fragilis* is larvicidal.' I never make these observations without showing them to responsible people so that they are able to judge for themselves. In this particular instance my witness was Dr. Graham Drew, the Deputy Commissioner of Public Health, Queensland."

I may here note that Dr. Hamlyn-Harris has several articles on the subject in the Proceedings of the Royal Society of Queensland, notably in Vol. XLI, No. 3, in which he gives a long account of the various predatory insects which prey on the Mosquito larvae.

In a later letter to me Dr. Hamlyn-Harris said : " My latest researches into the efficiency or otherwise of the *Charophyta* as possessors of the larvicidal property only confirmed what I said all along. To my mind they are utterly useless in Mosquito control. In the laboratory, conditions are so abnormal, that one finds that they breed sometimes, and sometimes they do not, but I have proved experimentally that by providing supplemental food, *Culex fatigans* can be induced to breed in overwhelming numbers. I am further of opinion that Professor Matheson's interpretations of his findings are inadequate because he has entirely ignored certain chemical phases of the question which may be responsible for the conditions which he obtained, such as the decrease of CO_2, the increase of carbonate due to the temperature of the water, according to the time of day ; therefore I do not believe that the *Characeæ* have anything to do with the conditions which he attributes to them. This briefly in a nutshell is, I fancy, all you need to know ; if you require any further information please write and I will communicate with you further on the subject."

I think from what I say in this paper about *Chara fragilis* and with the corroborative evidence of Dr. Hamlyn-Harris that it may safely be concluded that that species, in common with *Charophyta* collectively, has no larvicidal qualities.

THOMAS BATES BLOW.

EXHIBITING FERNS.

In exhibiting ferns for prizes at shows the first consideration must be to comply with the terms of the schedule. Otherwise, however good the plants may be, the whole lot is liable to be disqualified. A particularly bad case of this kind occurred only last year at a local show which shall be nameless. Suffice it to say that the writer only attended the exhibition as an ordinary visitor and not in any official capacity, and, of course, not as an exhibitor. One of the classes was for " one pot of fern," and several ferns were exhibited, but the plant which was awarded the first prize was *Asparagus plumosus*—not a fern at all! On inquiring cautiously why this plant had not been disqualified I learned that the plant was known as " Asparagus fern " and was therefore considered to be " within the meaning of the act." Other less glaring examples of inaccuracy are the exhibition of exotic ferns as British and of tender ferns in a class for hardy ones, or again when, say, " 6 British Ferns, distinct species or varieties," are specified, and 6 ferns are shown but two of them are of the same variety though possibly bearing different labels. Of course the mistake may be made quite innocently as the exhibitor may have received the plants under different names and they may even look different for a time if grown under differing conditions. Occasionally, even, a group may not contain the proper number of plants, seven being shown instead of six or eleven instead of twelve. In either of these cases the judges are bound to disqualify the exhibit however good the plants in it may be. Again, apart from the question of absolute disqualification, ferns should be harmoniously arranged, so as to show their best points, and the individuals should be proportionate to each other, not a haphazard mixture of giants and dwarfs. The individual plants should be shapely and not drawn out of their proper habit. The essence of beauty in a fern is symmetry though, of course, this is not the only quality required. Health, general culture and freedom from pests, are all important points; another is correctness of type while, last but not least, may be mentioned the quality of the varieties. Rarity is by no means an essential thing although, when other things are equal, a group of rare or difficult, or very choice varieties, will take precedence over an exhibit of ordinary, though well grown and beautiful, things. Variety is also a point to be considered in a mixed group. For instance, suppose a prize is offered for twelve British ferns : while one exhibitor may show not only distinct varieties but perhaps eight different species and four or six genera, another may put up twelve plants, of distinct varieties indeed, but perhaps all *Athyriums* or all *Lastreas* or mostly *Scolopendriums.* Other things being equal the group containing the greater number of genera and species would have a distinct advantage both from the point of view of effective display and that of a representative character.

Difficulties may sometimes arise over the exact interpretation of the qualifying words, " hardy," " British," " greenhouse," and " exotic," as applied to ferns. Take for instance the word " hardy." Does this mean capable of being grown out of doors, or with simple protection in any part of this country ? If so there are several British ferns which are not hardy, viz., *Asplenium marinum*, *A. lanceolatum* and *Adiantum capillus-Veneris.* These ferns grow wild in Britain and are therefore hardy *somewhere* in the country, but it is only in a few localities and in very favoured circumstances that they can be grown without glass protection or even without artificial heat. Genuinely British ferns are usually accepted as hardy although this is only true in a special sense. Then what is the exact meaning of " British " ? It is usually interpreted as " of British origin," i.e. either found wild in Britain or raised under cultivation from plants so found. It is arguable however that varieties of a British species should be considered as British even if found wild or raised under cultivation in some other country. There are beautiful varieties of *Lastrea dilatata*, *Asplenium marinum* and *A. lanceolatum* which have been found in the Azores and forms of *Asplenium trichomanes*, *A. viride* and perhaps

Scolopendrium which have been found on the continent of Europe. It seems hard that these should be excluded as foreigners but exhibitors will be wise not to depend upon their admission as British. *Asplenium fontanum* and *Cystopteris alpina* are species which are generally accepted as British, but it is very doubtful whether there are, in cultivation, any plants of them which have not been either imported or raised from spores of imported plants. In all these cases, however, judges usually err, if they err at all, upon the side of leniency, but it is always possible that some purist may stand out strictly for his own interpretation of the law. Lastly it is important that all plants exhibited should be, as far as possible, correctly named, as it is not fair to the visiting public to have false names foisted upon them at exhibitions.

F.W.S.

A HARDY TYPE OF ASPLENIUM LANCEOLATUM FROM FRANCE.

Our valued member, M. Paul Kestner of Lausanne, informs us in a letter that there is a type of *A. lanceolatum* which is perfectly hardy. It is found in the vicinity of Paris (Fontainebleau) and in some parts of Central France and extends as far East as the Vosges and Northern Alsace where the climate is certainly much more severe than in London or Lausanne. M. Kestner has recently sent us a frond or two, with spores, of this form. The plants were collected in the neighbourhood of Saverne, Alsace, the winter of which is probably more severe than that of most parts of England. The fronds do not seem to differ in appearance from the ordinary form of the species. We have sown the spores and hope in time to raise plants, some of which will be tried out of doors where they will be exposed to the ordinary vicissitudes of our insular climate. Plants of the British type from Devon and Cornwall, whether collected or seedlings, have always died, in our experience, out of doors as soon as an ordinarily severe winter came along. Should the plan succeed it will be an interesting example of acclimatization.

Similar experiments may be made with spores of *A. marinum* collected from the coldest places in which this fern can be found. It has been recorded from the counties of Aberdeen and Fife, which may be reasonably expected to produce a hardier type than that found in Cornwall, the Channel Islands or the West of Ireland.

MANURE FOR FERNS.

The subject named in the title has been suggested as one likely to be of interest to cultivators. It may be broadly stated that rank or fresh animal manure is injurious to most, if not to all, ferns, but there are many species which are benefited by a judicious top-dressing of well-decayed cow or horse manure especially on a poor or dry soil. The late Mr. T. Bolton used decayed manure freely for *Scolopendriums* with great success and our own experience indicates that *Athyriums*, *Scolopendriums* and *Lastrea filix-mas* will stand and will flourish the better for a moderate application of this stimulant and plant food. The late Mr. H. Stansfield used old cow manure freely for *Scolopendriums* and *Polypodiums* when grown in beds. It should be expressly stipulated, however, that manure is not to be given to ferns in pots as it breeds too many worms which are anathema to pot plants generally and especially to ferns. Should pot ferns require help, as they may when pot bound, it should be given in the form of clear, and not too strong, *liquid* manure and not as a solid application to the soil. Mr. Henwood grows *Polypodiums* as well as any one but uses mostly a mixture of turfy loam and leaf-mould with a light autumnal dressing of bone meal. The light vegetable soil, though good for the *Polypodies*, has the disadvantage of encouraging wood-lice, which are a great pest to the ferns and require to be kept down by systematic trapping and nocturnal hunting. We should never apply animal manure to *Aspleniums*, *Woodsias*, *Blechnums* or any such rock-loving and peat-loving species.

F.W.S.

OLD AGE IN FERNS.

All living organisms, equally with the suns and planets, are subject to the general law of growth, decay and final dealth, although there are wide differences in the time required to bring about final extinction in different species and varieties, some lives being finished in a few days while others endure for centuries or millenniums. In the case of ferns the species which produce spores freely and develop rapidly to maturity generally tend to be short-lived as individuals, while those kinds which breed with difficulty by sexual processes are longer lived. Of British species the shortest lived is *Anogramma leptophylla*, a native of the Channel Islands, which produces one crop of spores and then dies, while one of the longest is *Osmunda regalis* which will probably live for a century or more. *Athyrum filix-fœmina* and *Dryopteris paleacea* (*Lastrea pseudo-mas*) are also capable of living to a ripe old age under favourable conditions. Among varieties of a single species compare the cycle of *Asplenium trichomanes cristatum* with that of *A. t. incisum.* The former produces plenty of spores which give rise, under favourable conditions, to abundant seedlings which rapidly mature. The parent plant, however, after sporing freely for one or perhaps two years, sinks into senility, continues a lingering and miserable existence for a short time longer, and then dies. The barren *incisums* however grow into large clumps which can be divided again and again for many years without suffering any appreciable loss of vital energy. Nevertheless there is an eventual loss of vital force and it becomes more and more difficult to keep the plants alive after division. Several of the older types of *incisum* such as *laciniatum*, *triangulare* and *Claphamii* are either extinct or on the verge of extinction after a life of 50 years or so, while the more recent *Clementii*, although it still grows vigorously, is more apt to die after division than formerly and has become very scarce. *Asplenium lanceolatum microdon*, found in 1855 and propagated only by division, seems to have disappeared although at one time fairly widely distributed ; the present writer lost his plant during the severe frost of 1916-17 and has not been able to hear of it since in any other collection. *A. Adiantum-nigrum microdon* is also extremely scarce although of more recent origin, having been found in 1872. *Athyrium f.f. Victoriæ*, found in 1861, is plentiful in collections, having been propagated freely from spores, but the original is very scarce indeed and many of the plants seem to be suffering from senile decay. They are much less vigorous than the seedlings and are apt to die after division or during a bad winter or spring. *A. f.f. acrocladon*, found in 1860, is also getting scarce although seedlings were raised in 1878 and most of the plants in cultivation belong to that batch. *Polystichum angulare acrocladon* was found in 1862 and there is no record of any seedlings having been raised from it. It is now very rare indeed and probably exists in only one or two collections. *P. a. plumosum*, Elworthy, was found in 1856 and has never so far as is known been propagated except by division. It is described by Lowe as "a sterile form" and it is certainly very rarely fertile. Sori have, however, appeared on my own plant on several occasions, though only very sparingly and it is doubtful whether any spores ever ripened and certainly none ever germinated. The plant, however, still seems fairly vigorous, though less so than formerly and produces a crop of fronds annually. Another old fern which has become scarce is *P. angulare Pateyii* (*plumosum*, Patey). It was found in 1866 and was sent to the late Mr. Robert Sim of Foot's Cray, who raised a considerable stock of young plants, presumably from the bases of the fronds. These were distributed far and wide but now one rarely sees a plant of it. The late Mr. Thomas Bolton, Senior, of Warton, grew a very fine plant of it (as he did of most ferns he attempted) and this, upon one occasion, produced a crop of spores but, so far as is known, no seedlings of it were ever raised. It is possible that its fame was eclipsed by the advent of the *plumose divisilobes* which were easier to grow and propagate. It is a great pity that such a beautiful thing as *Pateyii* should be lost sight of since it is by far the finest of the wild-found *plumosums* in *angulare*. Growers who still have it will be well advised to take every care of it and to keep a sharp look-out for spores which may be again produced and would a give new lease of life to a very valuable variety. I have recently referred to the *angulare pulcherrimums* as short-lived plants (Vol. V, No. 10, p. 225) and am glad now to record that Mr. Cranfield still has a plant of my own No. 1 *pulcherrimum* and also of the aposporously raised type of *pulcherrimum variegatum*, both of which I have myself lost. I have now only a single plant of the original *pulcherrimum variegatum*, Moly, and, as it has ceased to produce bulbils as formerly, its life is somewhat precarious.

Scores of plants of this fern have been distributed during the last forty years but they seem to have been mostly lost although two or three members have single plants like myself. Some treasures which have been lost are *Asplenium marinum plumosum*, *A. m. multipinnatum*, *A. fontanum refractum*, *Adiantum Cap-Veneris Cornubiense*, *P. angulare Baldwinii* (the original), *P. ang. Lyellii* (probably), *P. a. pulcherrimum*, Wills, and *Blechnum sp. paradoxum*, of Whitwell, while others in danger of extinction are *P. lonchitis cristatum*, several fine forms of *Lastrea montana*, *Blechnum sp. plumosum*, Forster, *Lastrea pseudo-mas apospora cristata*, Cropper, and *Adiantum C. V. imbricatum*.

F.W.S.

OLD THEORIES ON FERN REPRODUCTION.

Living as we do in an age when new discoveries and inventions crowd in upon us in quick succession, we have learnt readily to accept the discovery of a mere yesterday as an old-established fact of to-day. We are, perhaps, losing our sense of wonder, and forget too easily the long period of darkness which has often preceded the light. We do not always trouble to enquire how the facts came to be known, or how many puzzled hours the early investigators spent in unravelling problems which cause us no trouble to-day.

These somewhat trite remarks were suggested by reading in Mr. Druery's book how the earlier botanists were "baffled in their attempts to follow through the life history of the Fern until nearly the middle of the nineteenth century, that is, until 1846, when Count Suminski discovered the final link in the chain by determining the nature of the archegonia, or female organs of the Fern, Naegeli preceding him by discovering and describing the antheridia and the antherozoids, and assuming the office they performed."

1846, and a momentous discovery in Cryptogamic Botany, a discovery scarcely older than some of our living Pteridologists! Let us see what was known and thought about the subject a short time before that date. On looking up some of my old Fern books, I find a tendency to avoid technical discussions about Fern reproduction. The authors were, perhaps, practical men rather than theorists, and felt that the subject was a little beyond them. Mr. G. W. Francis, however, tackles it boldly and gives a detailed account of the current opinions, including his own. The Preface to the first edition of his book, "An Analysis of the British Ferns," is dated 1837, and while a third edition was published in 1847, the author admits that he had spent much time abroad and had made no addition to his store of Fern knowledge since the book was first published. His remarks are therefore those of the earlier date, before Suminski's illuminating discovery had been published

The distinction between seeds and spores was already understood, and Francis gives a good account of the differences. He describes the germination of spores, saying that the first frond is not unlike a Lichen or a Marchantia, and differing much from the fronds of future growth. The term "prothallus" is not used. The trouble began when the subject of fertilisation came to be discussed. "The reproduction of Ferns," he says, "is a subject involved in much obscurity. Hedwig, Bernhardi and others have proposed theories to explain this intricate matter, but without success. That the Ferns have no visible flowers is evident, but that they have some apparatus analogous to stamens is maintained by most of our first botanists. So keen has been the search for these in the present tribe, that every part of the plant has been subjected to the minutest investigation : not only the thecæ, their ring, and their cover, but the spiral vessels of the rachis, the stomata upon their cuticle, and the glands which are sometimes found attending upon them." The remainder of the paragraph is not easy to follow, and we share the obscurity which affected the early investigators. They felt that there *must* be stamens, or something equivalent to them, to be found somewhere. "Sprengel long ago stated that the young sori, or rather that the swelled extremity of the veins of *Polypodium vulgare*, which sometimes remain abortive, and at others produce thecæ, were filled with oblong-shaped bodies of a greyish colour, which he considered to be stamens, and as yielding pollen as do the external stamens of flowering plants. These, being attended upon by young ovules, the latter became impregnated and grew to perfection, while the pollen masses were decayed or absorbed."

Where the young ovules, which "attend" upon the so-called pollen grains, come from is not made clear In any case, no one at that time seemed to worry about the under surface of the prothallus, search for the missing elements being wholly directed to the frond itself. Sprengel's observations were apparently supported by some rather poor drawings, which failed to carry conviction to other investigators, with the result that for a time his findings were disregarded. Professor Link carried on the investigations and definitely described "long hollow filaments, separated by septa into articulations generally simple, rarely ramified ; the last articulation is thicker and filled with a delicate granular mass. These parts are frequently longer than the capsules and are easily distinguished from the young capsules." Professor Don agreed with the view that these were the stamina of Ferns, adding that Link found them in most of the Ferns he had subjected to microscopical examination. Mr. Henderson is quoted as having denied that there was any impregnation in Ferns, Mosses, or Equiseta, but later changed his mind and agreed with Link's views. He added that there were "two kinds of granules in the unripe thecæ of Ferns, *Lycopodium* and *Ophioglossum*; that the one kind is mostly absorbed during the maturing of the other; and by submitting each to the test of iodine, he proved the one to be starchy—the other more of the nature of pollen." Similar "pollen granules" were found in the thecæ of most of the other Cryptogams, which fact was taken to confirm the views held regarding the ferns. "Thus," says Mr. G. W. Francis, "the matter seems set at rest."

All this was less than ninety years ago! Since then we have measured the universe and have split the atom.

S. P. ROWLANDS.

PROMISING AVENUES (and things to be avoided) IN RAISING FERNS.

In raising seedling ferns there are two main objects generally in view. First, the production of stocks of good things for distribution, commercially or otherwise; second, the production of new varieties. The first of these is entirely legitimate: the second is only valuable when it is pursued intelligently and with a distinct ideal of achievement. The man who sows wishes to produce "something new" with which his name may be associated. This ambition is quite meritorious so long as the thing to be produced is an improvement upon existing forms. There is a danger that the craze for novelty at all costs may result in certain gardens being crowded with ugly weaklings and deformities to the neglect of older and much better things. It is comparatively an easy matter to produce something different by crossing two very dissimilar varieties. The result is, too often, the birth of a monster—an organism which is trying to do two or more different things at the same time and succeeds only in doing them very badly. It is true that occasionally something worth growing is produced, but the combination of two unrelated characters generally results in the deterioration of one, if not both, of them in the offspring. Take for instance, the attempt to combine the plumose and the crested characters in any species. When anything of this kind has been attained it has generally been by accident and not as the result of cross-breeding. Mr. Druery's *A. f.f. plumosum percristatum* is perhaps the best known combination of the two characters and, at its best, it can be a beautiful thing. It is however rarely, if ever, so beautiful as the best uncrested *plumosums* such as those of Druery, Horsfall and Barnes. What then is to be sought in crossing varieties? The answer is, the combination of characters which are in harmony with each other—each of which enhances, rather than neutralizes, the beauty of the other. Such combinations are *divisilobum* with *perserratum* and *perserratum* with *congestum* in *angulare* and *sagittato-projectum* with *crispum* or with *crispum fimbriatum* in *Scolopendrium*. Should a variety worth growing be found wild it should, if fertile, be sown in the hope of getting an improved type among the seedlings. Such hopes, though sometimes disappointed, are quite well founded and are often abundantly rewarded as in the cases of the plumose divisilobes in *angulare* by Col. Jones, the *gracillimums* in *aculeatum* by Mr. Druery, and the improved bipinnate *Blechnums* raised from the finds of Airey and C. Henwood. The haphazard mixing of a number of varieties with the idea of getting something, you know not what, is out of date and should be abandoned. We have already too many queer things—we want beautiful things, and of them we shall never have too many.

F.W.S.

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette.*

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

F. W. STANSFIELD, M.D., F.L.S.,
120, Oxford Road,
Reading,
Berks.

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ENFIELD, MIDDLESEX.

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December, 1932.

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EDITED BY

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, F.L.S., "Monkhams," Lower Road, Great Bookham, Surrey.

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EDITORIAL NOTES.

Mr. W. H. Stansfield, of Southport, informs us that *Adiantum capillus-Veneris* has been found in Morecambe Bay. Mr. Stansfield himself found a single plant there in 1878. He has revisited the locality this year and found that his solitary plant had increased to some fifty or so, most of them only an inch or two in height. This is believed to be the most northerly station in Europe for this fern and the record is therefore of special botanical interest.

M. Kestner writes us that he has rediscovered *A. capillus-Veneris* near the shore of Lake Neuchatel in Switzerland, where it had been long known but had been thought to be extinct for some years. We quote from his letter :—

DEC 27 1932

" The ferns are fully exposed to the North-East wind, which is about the coldest we have in Switzerland. It is true that the wind has to travel across the lake before reaching this station, but in the winter of 1928-29 the lake was frozen deeply enough for cart traffic to be carried across. I am confident that this fern will be able to grow without protection in my garden."

M. Kestner has kindly sent us spores from this fern, which will be duly sown. (Mr. T. B. Blow informs us that he found *capillus-Veneris* in Japan in a station where it was liable to be frozen hard every winter.)

M. Kestner has also recently visited a station for *Gymnogramma leptophylla* where the fern was discovered a few years ago. " This is the coldest station known for this fern which, on the continent, is otherwise not known North of the Alps. It should be another possible addition to the hardy fern garden." Of course, *leptophylla* is known as an inhabitant of Jersey, but the *winter* climate of that island is undoubtedly much warmer than that of Martigny.

Mr. Robert Pease, of Lostwithiel, has sent us a frond of a ramo-cristate form of *Blechnum spicant* which has been found in his neighbourhood. It is very similar to *ramo-cristatum*, Maunder (1876), but has, if anything, somewhat larger terminal crests. As both Maunder's original *ramo-cristatum* and his *conglomeratum*, which was raised from it, have now disappeared we have suggested to Mr. Pease that the spores of his new find, when produced, should be sown in the hope of raising a new *conglomeratum*.

OUR FRONTISPIECE.

Polystichum angulare rotundatum, Phillips.

The illustration is from a photograph of a plant growing in an open-air shelter in the Editor's garden. It is a piece of the original plant found by the late Mr. W. H. Phillips in N. Ireland in 1877. The variety is still rare and we are not aware that seedlings have been raised from it on any large scale (we have a couple which came up casually), which fact accounts for its scarcity. We consider it a more elegant plant than the older *rotundatum* of Elworthy, which is well known, though it also seems to have become rather uncommon of late years. Both forms of *rotundatum* are good old classics and are much better worthy of cultivation than the many mongrel forms which are now so frequently seen in collections to the exclusion of better things.

OBITUARY : BOWMAN.

We regret to announce the loss of an esteemed friend and a faithful member of the Society, viz., Mr. J. H. Bowman, of Greenham Common, Newbury, Berks, who died on September 5th last, aged 85. Mr. Bowman, formerly an important official of the Bank of England, had been retired from active business for many years and had made a beautiful garden on land reclaimed from a common previously occupied by gorse and heather. He was not a fern specialist, but was a good general botanist, who took an interest in all the British species of both flowering plants and ferns, with many others, and grew many of the rarer ones in his own garden. He grew also an extensive collection of hardy trees, of which he had many beautiful and uncommon kinds. A most hospitable and kindly man, he was always ready to welcome anyone who took an interest in his favourite plants. He underwent a somewhat formidable surgical operation about a year ago, but recovered from it and we had the pleasure of going round his garden with him in the summer, when he was as genial and chatty as ever though evidently not quite so vigorous. The world is poorer for his loss. He leaves a son, the respected professor of mineralogy at the University of Oxford, to whom we tender our sincere sympathy.

THE ANNUAL MEETING, 1932.

The Thirty-seventh Annual Meeting of the Society was held on Thursday, August 25th, at the Prince of Wales Hotel, Southport. In the absence of the President, the Chair was taken by Mr. T. B. Blow, F.L.S. (Vice-President).

The Chairman briefly welcomed the members to Southport and regretted the absence, through illness, of the President.

The Minutes of the last Meeting were read, confirmed, and signed by the Chairman.

The Hon. Secretary read his report as follows :—

" Mr. President, Ladies and Gentlemen,

While the past year has not been one of marked progress by the Society, it has been one of steady work and our strength has been practically maintained notwithstanding the lean times through which our country, in common with most others, has been passing. The number of members now is 119 ordinary and 9 honorary. Three valuable members have died, viz., Dr. G. C. Druce, F.R.S., a distinguished botanist of world-wide reputation, Mr. George Oliver, of Melrose, who was a skilful cultivator of ferns and an exhibitor at the Southport and other important shows, and Mr. J. K. Woodmansey of Knaresborough. Seven members have resigned, none of whom has taken any active part in the work of the Society. Eight new members have joined the Society since the last annual meeting, viz. :—Mr. Albert Prince and Mr. W. H. Prince, of Tarporley, Cheshire ; Mr. Ewart G. Smith, of Christchurch, New Zealand ; Mr. Selwyn Duruz, of Wallington, Assistant Secretary of the Alpine Garden Society ; Mr. W. T. Davies, of Port Dinorwic, Caernarvonshire ; Mr. B. H. Keall, of Chelmsford, Essex (who is the son of a famous old fern hunter, the late Mr. W. J. Keall, of Wantage, Berks) ; Mr. Alfred Kirby, of Roath, Cardiff, an old member who has returned to the fold ; and Mr. Arthur Oliver, son and successor of our late member, Mr. George Oliver, of Melrose. The times, I fear, have not been propitious for fern hunting as we have all had to work hard to pay our taxes. Nevertheless, some hunting has been done : after the last General Meeting a plumose form of *Dryopteris montana* was found in Yorkshire and, though this may not be equal to some of the previous "finds" of *plumosa*, it is a handsome fern well worth growing and may improve after further liberal culture. Mr. T. B. Blow found, as recorded in the GAZETTE for December, 1931, near Lake Annecy in France, a decompound form of *Asplenium Ruta-muraria*, which is probably the most distinct variety known of this species, but which requires to be tested under cultivation for permanency. Mr. Alfred Hollings has found, on Waddington Fell, near Clitheroe, a congested form of *Dryopteris montana* which may fairly claim to rank with the forms of Greenwood and Barnes. *The* "find" of the year, however, and the best fern found wild for many years, is Mr. Greenfield's incised form of *Asplenium viride*. This was found in Switzerland shortly before the last Annual Meeting, but we did not then know about it. It is a beautiful thing and may fairly claim to rank with the best forms of *A. trichomanes incisum*. Many so-called *incisums* have been found before, but all that I have seen have been mere *serratums*, differing very little from the normal, and in quite a different category from the barren *incisum* forms of *trichomanes*. One, however, reported to have been found on Whitbarrow in 1853 by Mr. James Huddart, is described by Lowe as being "a copy of *A. trichomanes incisum*." Unfortunately, no specimen or drawing of it is known and there is probably no one now living who ever saw it. If correctly described it must have been something like Mr. Greenfield's "find." The latter is now a healthy little plant and in good character, though it has fronds only about an inch long. It is a great responsibility to have such a treasure in one's charge. Reverting now to last year's report of the supposed *Lastrea æmula grandiceps*, this plant has now attained to fair development, but has declared itself as being distinctly *dilatata* and not *æmula*. It is very similar in cresting to *L. dilatata grandiceps*, Barnes, but differs from that variety in having much paler, and in fact almost concolorous, scales. There is therefore considerable excuse for its having been taken for *œmula* as it was a very tiny plant when found and the earliest scales showed no sign of the characteristic dark stripe of *dilatata* and were practically undistinguishable from those of *œmula.* It is quite a creditable "find," all the more so for having shown so little character when first noticed.

F. W. Stansfield."

The Hon. Treasurer, Mr. J. J. Sheldon, read his report as follows :—

BALANCE SHEET.

Income.	£	s.	d.	Expenditure.	£	s.	d.
Balance from last year	56	15	6	Affiliation Fee, R.H.S.	2	2	0
Subscriptions ...	47	5	0	Gazette, Dec., 1931	15	18	2
Sale of Gazettes ...	3	8	6	,, June, 1932	15	2	0
Advertisement ...	2	2	0	Printing	1	7	0
Plates for Gazette (given by M. Paul Kestner)	2	5	0	Cheque Book ...		2	0
				Postages and Sundries	2	19	11
				Expenses at Annual Meeting	5	0	0
				Balance at Bank ...	69	4	11
	£111	16	0		£111	16	0

Audited and found correct, August 24th, 1932.

(Signed) Percy Greenfield,
Auditor.

It was proposed, seconded and resolved that the Secretary's and Treasurer's reports be adopted.

A letter was read from the President, Mr. W. B. Cranfield, regretting his inability to be present through illness, and indicating his willingness to continue in the Presidency for another year, if desired, and his equal willingness to step down should any other President be elected. A letter was also read from Mr. G. E. Stephens resigning his Vice-Presidency on account of his being unable to attend meetings held in the North. The Secretary was directed to write to Mr. Stephens requesting him to reconsider his resignation of the Vice-Presidency. Subject to this contingency, it was resolved, on the motion of Mr. T. Bolton, seconded by Mr. J. Lovelady, that the Officers and Committee be re-elected *en bloc.*

The Hon. Secretary proposed, and Mr. Sheldon seconded, that the seven gentlemen previously reported as having joined the Society since the last Annual Meeting, be now formally elected members of the Society. The motion was unanimously carried.

After some discussion it was agreed that the next Annual Meeting should be held in the South of England, and it was proposed by Mr. Whiteside, seconded by Mr. Bolton, and resolved that the place and date of meeting be left to the Committee to decide. It was suggested that the meeting should not be held at the time of the Southport Show, but, perferably, later in September or, alternatively, earlier, in June or July.

A large selection of cut fronds was sent by the President for inspection, including a number of forms of *P. angulare divisilobum plumosum*, *P. ang. flabellipinnulum*, Wills, *P. ang. perserratum*, Wollaston, two of the best forms of *L. montana plumosa*, and a number of fine forms of *Scolopendrium v. crispum.* Colonel Parker, of Browsholm Hall, near Clitheroe, sent a couple of well-grown fronds of the new crested form of *filix-mas* found last year upon his estate. It is pure *filix-mas* and not *paleacea*, neatly crested and having long slender upward curving pinnae. It was named *Dryopteris filix-mas cristata tenuis*, and upon the motion of Mr. Bolton, seconded by Mr. Whiteside, Colonel Parker was awarded a certificate of merit for the variety. Mr. Alexander Cowan sent a frond of a fine polydactylous or crested form of *D. propinqua*, which he had recently found wild in Ross-shire. The members desired to have another opportunity of seeing a frond of this fern after a year's cultivation.

Mr. E. J. Stephens, of Welwyn, sent a fine frond of a crested form of *Dryopteris paleacea* (*Lastrea pseudo-mas*) found by him in Eskdale. The frond was much admired, but as it could not be distinguished from the old *paleacea cristata* of Moore, it could not be given a certificate as a new variety.

The Rev. Canon Kingsmill Moore sent two fronds of a seedling *Polystichum aculeatum*, which had come up self-sown in his garden. It was obviously a *pulcherrimum* and had some resemblance to the late Mr. Joe Edwards's *pulcherrimum foliosum*, having the divided lower pinnules of a *pulcherrimum*, but not the falcate character of the *gracillimums*. The members hoped to have another opportunity of seeing this fern when more fully developed.

The Hon. Secretary exhibited a frond of a variety of *Athyrium f.-fœmina* found by the Rev. C. H. Binstead, F.L.S., at Grasmere. It was finely dissected and very erect and rigid in growth, in which latter character Dr. Stansfield said it resembled a form found by Mr. Cranfield and himself in N. Wales in 1920.

The Hon. Secretary proposed and Mr. Lovelady seconded, and it was resolved that the best thanks of the Society be sent to the Southport Corporation for the use of the room for the meeting and for their general encouragement of the cult of British Ferns at successive Shows.

THE OFFICIAL EXCURSIONS, 1932.

Only a small number of members turned up at Wrexham for the projected fern-hunting in North Wales after the Annual Meeting at Southport. There were Messrs. T. B. Blow, P. Greenfield and the Hon. Secretary with Mr. H. F. Greenfield as a companion and possible future recruit. The immediate neighbourhood of Wrexham did not seem promising as a hunting ground, but with the help of the numerous motor omnibuses we were enabled to reach ferny districts and found a fair number of species, viz. :—*Athyrium filix-fœmina*, *Blechnum spicant*, *Dryopteris dilatata*, *D. filix-mas* and *D. paleacea*, *Polystichum aculeatum* and *angulare*, both rare, *Scolopendrium vulgare* and *Polypodium vulgare*, also rare, *Pteris aquilina* (not by any means plentiful), *Asplenium Ruta-muraria* abundant on walls, with occasionally *A. trichomanes*, *A. Adiantum-nigrum* and *Cystopteris fragilis*, all uncommon and almost isolated plants. We saw no varieties. Of flowering plants we saw a large patch of a white variety of *Campanula rotundifolia*, and near Mold a considerable colony of *Erinus alpinus* apparently quite at home on limestone rocks, but obviously an escape from cultivation or possibly deliberately sown by someone who wished to "improve the flora of the country." Also *Paris quadrifolia* in one place only. After sampling the country around Wrexham for several days, the party decided to move into a more ferny district, so we shifted our quarters to Bettws-y-Coed. Here we found ferns much more abundant, the new species noted being *Dryopteris montana*, *D. propinqua* (rare), *Allosorus crispus*, *Ceterach officinarum* and *Polypodium phegopteris*. Most of the species previously seen were also in evidence and much more generally distributed Near Lake Idwal we found the fern allies, *Lycopodium alpinum* and *L. selago* and, flowering in the lake itself, was *Lobelia Dortmanna*. The only fern variety noticed was a crested form of *filix-mas*, near Capel Curig. Although this was quite different from any previously known variety, because the character was somewhat irregular and unequal (some of the fronds being well crested at the tips of the fronds and others only, or mainly, on the pinnae) we did not remove it from its home, but contented ourselves with taking spores in the hope that an improved form might be raised from it. There was, however, about this plant, nothing of the depauperate character so often seen in forms of this species. Not far from Bettws-y-Coed we found a single patch of a dwarf *Epilobium*, strongly resembling *Anagallis tenella* in habit and foliage, and our first diagnosis was *E. alpinum*, *L.* (*anagallidifolium*, Lamarck), a rare inhabitant of the Scottish mountains, but, on a specimen being submitted to the experts of the British Museum of Natural History, it was declared to be *E. nummulariæfolium*, a New Zealand species and therefore an alien intruder like *Erinus alpinus*.

THE ANNUAL MEETING, 1933.

The Committee, having considered the question of the locality for the next Annual Meeting, have decided, by a large majority, that the neighbourhood of Helston, Cornwall, is likely to afford a suitable hunting ground. Also that the month of July will be the most generally convenient. Our member, the late Mr. H. Relton, stayed in the district for some weeks in 1921 and some of his experiences are recorded in the GAZETTE, Vol. V, p. 55. Mr. Sheldon has also stayed there for a week or two and found good hunting, *angulare* and *Scolopendrium* being plentiful along with the *Aspleniums*, *Adiantum-nigrum* and *trichomanes* and *Lastrea œmula* not infrequent, as also other *Lastreas*, *Polypodium vulgare*, *Athyrium* and *Blechnum*, while *Asp. lanceolatum* and *marinum* were found on the coast, and *Osmunda regalis* inland. There is, then, plenty of raw material for hunting and the daylight is long in July. The weather at this time is cooler in Cornwall than further inland. The meeting will be held at 10 a.m. on Monday, July 4th, at the Angel Hotel, Helston, which will be the headquarters of the Society. Members are advised to arrive at Helston on the 1st, or not later than the 2nd of July, so as to have time for a preliminary survey of the land. We believe the hotel will be found comfortable and the charges moderate. Visitors are requested to make application, if possible, at least a fortnight before the time of their arrival, letters being addressed to the proprietor, Mr. R. H. Fisher.

FERNS AT SOUTHPORT SHOW

(From an exhibitor's point of view).

If I were a reporter of some big horticultural paper or even an "Amateur Gardener." I might be able to give my impressions of the ferns more fully but I am only a dairy farmer with four years' experience of ferns and would much rather use a spade than a pen. First of all I will commence with Mr. John Lovelady's group, the great centre-piece a wild find [*Athyrium f.f. plumosum divaricatum*—Ed.]. I think there was nothing in the show like it, with its great wide fronds—it was a wonder and very beautiful to gaze upon. Mr. Lovelady had a fine lot of well-grown plants. I offered him a lump sum for them but it was turned down with a "No thank you." I think he would have drawn a better card if he had given his plants a little more space—there is always plenty of room above. I come now to my own group: the schedule is asking every year for effective arrangement and I tried to work this in. I think if I had filled in the two ends a little more I should have stood a better chance of getting a higher card. Now a word about the mighty group of Messrs. Bolton—first prize and silver challenge trophy. They were just a plain bank of well-grown British ferns—the great fine *Scolopendriums* were a treat—with no effective arrangement except about three clumps sitting up on poles. I have been all over the country hunting ferns but I never caught one trying to balance itself on a stick! I think it looks most unnatural. I can see Messrs. Bolton and Son carrying off the cup next year. Who is going to provide the next? Digging up all your best ferns and carting them off to Southport, bringing them back and replanting them with a sprinkling of bone meal and new earth, means a lot of hard work. I can see the British Pteridological Society going "down the nick" if there is not something more done. What are you doing? The money locked up should be made use of.

Mr. Henwood—a fine gentleman for 85—writes with a firm hand and has sent me spores from some of his best plants. He says you are his spiritual and medical adviser. I know you will treat him well as you have always treated me well. Would you care for a few choice hardy heathers?

I want to show some little appreciation for the kind manner in which you have always answered my inquiries.

I am, Sir,
Yours sincerely,
JOSEPH LLOYD.

[Our correspondent criticizes his competitors without malice and certainly does not unduly laud his own exhibit. The three leading groups at Southport were very nearly on a level—all had their strong and their weak points—and a very little modification in some of them might have altered the order of the awards.—*Ed.*]

NEW FORMS OF CYSTOPTERIS ALPINA, DESVAUX.

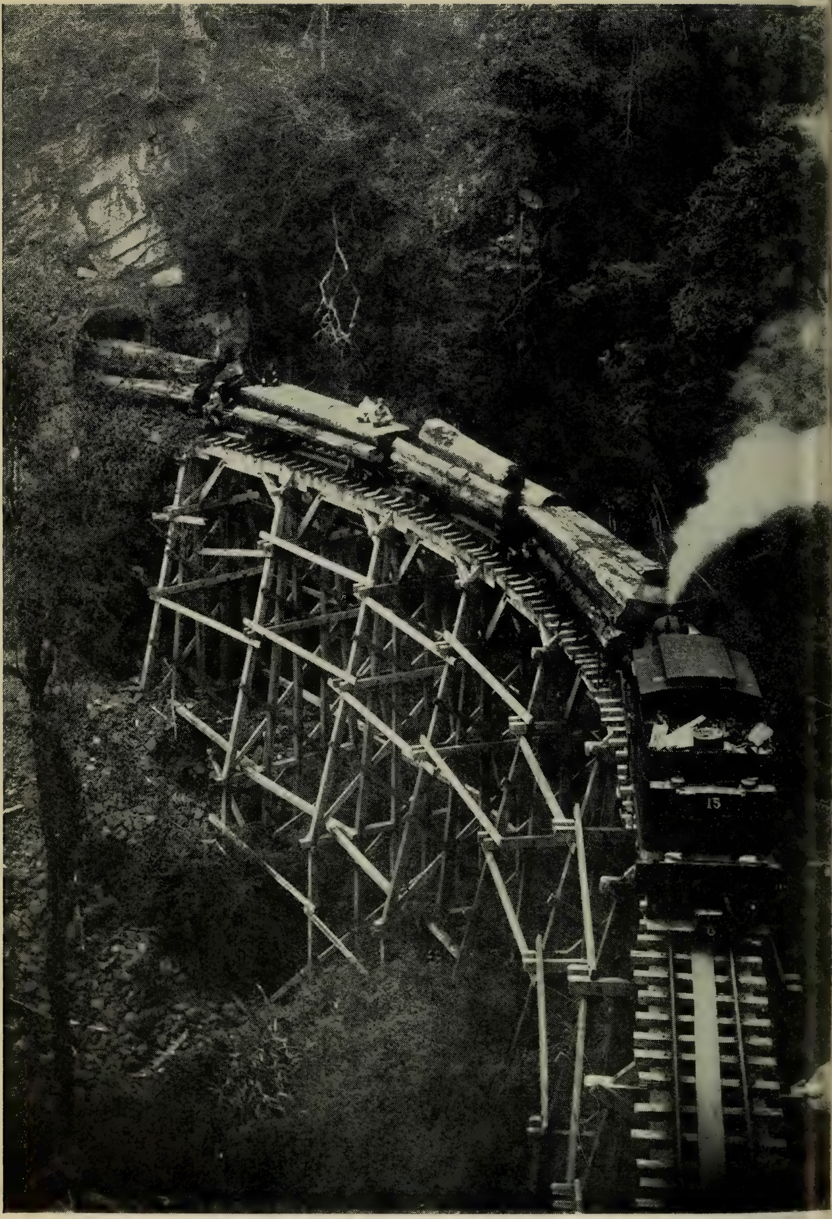
I have now four quite distinct types of this species and, in all probability, there are others to be found if sought for where the species is abundant. Of the four types two, viz., *obtusa* and *dissecta*, have already been described (GAZETTE, Vol. VI., p. 17). The third form is one collected by Mr. Greenfield at 7,000 feet near Kandersteg in 1931. I take this one as provisionally the type of the species because it is the one around which the others range themselves and from which they seem to radiate. It is tripinnate, the ultimate segments being rounded and notched, with the venules terminating in the notches. It is less deeply divided than the forma *dissecta* but more so than *obtusa* and has all the botanical characters of the species. The fourth form was a plant sent by M. Kestner in 1931 and collected by him at near 7,000 feet. It is generally similar to form 3 but differs from it, as from all the others, in being decidedly crispate and dense—a beautiful thing to which I have given the name forma *crispa*. I propose to sow spores of forms 3 and 4 and am pretty confident that, like the other two, they will come true to type under cultivation in the lowlands of England. Forma *obtusa* is the nearest to *C. fragilis* and it is probably from this that the degenerate *alpinas* described by M. Kestner (GAZETTE, Vol. VI., p. 35) have been derived.

F.W.S.

SHINOBU-SHINOBU.

For several years during my intermittent sojourns in Japan I had much desired to visit Formosa, mainly from a botanical point of view. On my last short visit three years ago the opportunity arose, for I found myself delayed in Japan for over two weeks, owing to being unable till then to get berth accommodation on the Siberian Railway through Russia. So, though the time for this visit was far too short for such a journey, yet as the chance was never likely to occur again, and as influential Japanese friends kindly gave me introductions to important people in the Island, I decided to go, so sailing from Kobe on the very fine ship " Fuso Maru " with very good accommodation and food, we passed through the wonderful Inland Sea of Japan, and with a halt at Moji, I reached Keelung, that most picturesque port at the extreme North of Formosa. My Japanese friends in Kyoto had apparently written to their relatives in Taihoku, the capital, to say when I would arrive, and an official of the Japanese Tourist Bureau met me on the boat and said, " Please hand me your luggage and you will find it in Room No. 4 at the European Style Railway Hotel opposite the Station." So getting on the train for the short journey of 12 miles and arriving at the hotel I found my baggage being taken up to my room. The friend who had arranged all this was I found a prominent merchant in Taihoku with branches in various towns all over the Island. In a few minutes he called me on the telephone to say that a banquet, at which he must be present, prevented him from seeing me that evening, but he would see me off by the train next morning and tell me all the arrangements which he had made for me—he knew my itinerary which had to be kept strictly to time to enable me to see and do what I wished. A well-equipped train keeping time to the minute was to take me to the town nearly the most southerly point to which I was going. This was a largish town called Tainan, distance 220 miles. On arrival I found the hotel porter, who took me to the room that had been taken for me at the Azuma Kwan Hotel opposite the station, and there I stayed in great comfort for four days. It was the finest Japanese style hotel I had ever been in and charges correspondingly high, but I was certainly most carefully looked after. I had two large rooms and two servants waiting on my every need. A very large bathroom was near by. The landlady was most kind and attentive and the food excellent—her good-looking daughter had learned English at the Mission School in the city. Now why is my article headed Shinobu-Shinobu ? At a station some 40 miles north of Tainan just as the train was moving out, I saw a man with a basket shouting these words which I knew were the Japanese words for " Fern, Fern " ; I could not see what was in his basket, but at the next stop, Kagi, I saw there was a seller of the very young fronds of the Bracken, and later when I stayed at Kagi I found these fronds were extensively used, as those being gathered from this mountainous district were specially liked for food in the Chinese eating-houses which abounded in and around the large market of Kagi—they were everywhere there and apparently were cooked with, I think, Soy (Shoyu, the universal sauce of Japan and the base of some of our older and well-known sauces). In Japan itself I have never seen these fronds actually used as a food dish, but the very tender tips are often seen in soups. As I have said I was very well looked after by everyone in Formosa and the Mission people in Tainan were particularly kind in entertaining me, and the Doctor there was Dr. Cheal, son of our well-known nurseryman. But time was always pressing, and after a motor trip on a public carriage of 30 miles to the most southerly point I touched called Takao, I (though an old motor driver) was quite frightened with this journey and decided to come back by rail. There was a great deal of water about in this district and I was searching for my favourite plants, the *Charophyta*, so I walked for several miles to the next station north, and had a very fair collecting time. Near this station is a most interesting old Dutch town and fort still in good preservation. I got back late, and as I had not told the hotel people of my movements, they were

A gigantic Formosan Cryptomeria Tree.



Bringing down the Timber.

quite alarmed for my safety. I left Tainan with regret, and took the afternoon train to Kagi as I wished to go up to Mount Ari by the wonderful railway. At Kagi, close to the railway station, there is a large monument which tells you that you have entered the Tropic of Cancer. Here I made an error in my hotel : I ought to have stayed at the one near the station, and thought that the man who seized my luggage was from that hotel, but I was taken to another one a little way off, but still it was a good one. I amused the Tainan and Kagi hotel people by going to their kitchen to cook my compressed Quaker oats ; they, as is common with all Japanese, were seekers for knowledge, and the cooks took careful notes of the way I prepared it. Also to tell how promptly the Japanese work, I found I had left my tin of oats in the kitchen of the hotel at Tainan. I at once got on the telephone, and, though my Japanese is not classic, they at once understood and the tin arrived by train inside of four hours, so that it was in time for breakfast next morning. The reason I had to stay at Kagi was to go up Mount Ari and to see its varying flora during the rise from sea level to 7,500 feet. The railway is 40 miles long, but of this about 20 miles are tunnels, many of them in circles in the mass of the mountain emerging some hundreds of feet higher. It starts through tropical cultivation with pineapple and banana plantations, etc., then passes through dense forests of camphor trees, for Formosa provides the bulk of the world's supply of camphor ; later tree and other immense ferns, also some epiphytal Orchids, then a region of pines and finally the forest of gigantic Chamaecyparis Formosensis for the getting of the timber of which the railway was constructed. At Numanohira, where the passenger service stops, one gets fair accommodation at either the Arisan Club or the Arisan Hotel. The timber is as immense as that of the Yellowstone Park giants, and the trees are of an allied species. So large are they that a mill, with immense band saws, cuts the twelve-foot lengths longitudinally into four pieces and then these pieces will just go on to the railway trucks, and they are further cut up in the gigantic saw mills at Kagi. It is a temperate climate up here, and the cherry trees were in full bloom. I gathered fronds of several species of ferns, and next day posted them to Mr. Perry to see what he could raise from them. Mount Morrison can be climbed from this point: it is 13,000 feet high and the highest mountain in the Empire of Japan. Next day we left, but, by a slight derailment, were delayed and arrived at Kagi just too late to see the saw mill at work, but we were shown over it, and in the show room saw the enormous planks which represent nearly all the wonderful timbers which grow on these mountains, but again time pressed and I was forced to get on, so next day I took train back to Teihoku, where my friend met me and entertained me at a very elaborate Chinese dinner which I wonder I survived. He told me that next day he would be at my service with his motor car, and after visiting the botanical gardens and a number of interesting places around this fine city, we finished with a call at the University and Dr. Shidehara, the head of the University and brother of one of the Cabinet Ministers, Baron Shidehara, received me most kindly and saying that he was no botanist at once sent for the Professor of Botany who I found had studied for some long period in London and knew all my botanical friends there. He was very much interested in seeing the *Charophyta* that I had collected, though I had not done very well in this way owing to being a little early for the crop, but he said that when he took his students out for field botany he would instruct them to collect, so I left the whole of my collecting outfit with him.

Next day I was told at the hotel that I would find my luggage in No. 10 cabin on the steamer at Keelung, so I departed early for the port and had an interesting botanical collecting time before the ship sailed—again a very comfortable boat in every way.

Altogether it was an eventful trip, and there must be many new plants and ferns to be found in that gigantic mountain range which runs from end to end of the Pacific side of the Island, culminating about the middle in sheer cliffs of 7,000 feet high. Hardly any English botanists have been there : Mr. Elwes made a visit, but I think it was a very short one.

Japan acquired Formosa as a result of the Japan-China war and it was a miserable country, the Chinese cultivators being constantly raided by the tribes (of Malay origin) of the mountains who were also head hunters. The Japanese promptly put a stop to this, and these savages now are a peaceful people. Its great plain from the mountain foot hills to the opposite coast is covered with vast sugar cane plantations with many up-to-date mills and refineries which unfortunately foul the rivers with their effluents. All sorts of tropical and sub-tropical fruits and vegetables are sent to Japan. These were quite lacking in former times in Japan. Minerals have not yet been much exploited. There is coal but it is poor. The towns, then filthy and insanitary places, have now very fine buildings, wide streets, electric light everywhere and up-to-date sanitation. The railways are quite up-to-date : the Government railways are over 600 miles in length and beautifully equipped. There are 350 miles of private lines and 700 miles of what are called light push car lines. You have a tiny open carriage and it is pushed by one or two men, so it is quite easy to get about, and added to this there are very many motor conveyances running frequently everywhere at most moderate prices. Private cars are also to be hired.

Altogether the Japanese have made this Island to blossom like the Rose and it still deserves its name Formosa, which means "The Beautiful." I left it with regret, and after a pleasant journey back to Kobe, returned to Kyoto, did my final packing and left for London via Siberia, doing the whole journey in fourteen days, seven being in a Russian railway carriage, against fifteen days in a similar railway carriage on the outward trip. This was owing to the Russian-Chinese fighting on the direct line and the diversion of the traffic to the old route via Habarosk (Khabarobsk).

THOMAS BATES BLOW.

MORE RANDOM REMARKS ON FERNS.

When Mr. Elliot spoke of making ferns grow where they didn't want to, he invented a happy and striking phrase. But why make them grow where they don't want to ? Only a gardener can answer this question, and not always can he give a satisfactory answer. The true gardener has an instinct for growing difficult things, a pride which a mere botanist can never feel. It is no bad thing, therefore, that some of the finest and most interesting ferns are also those which need the most care and attention in their cultivation.

Difficulty in culture among our British ferns is seldom due to lack of hardiness. Some, owing to the fineness of subdivision of their fronds, may be unable to withstand the injury inflicted by heavy rains, while others resent the cutting winds and alternations of wet and dry, of heat and cold, to which they would be exposed in an ordinary garden border. Difficulty, too, may be due to some inherent miffiness of constitution which occurs occasionally in some of the most desirable variations. The fact is, the cultivator must be prepared to go more than half way to meet the requirements of his plants. Ferns cannot supply their own environments : this must be given by the gardener. Fortunately, most of a fern's requirements can be supplied with the exercise of a little ingenuity. Shade, and shelter, soil and situation, present problems which may be difficult but are usually capable of solution. The bother begins when a plant demands a pure mountain air, or a symbiotic fungus as a bed-fellow, before it will consent to thrive. Fortunately such demands are seldom made, and we are more inclined to feel thankful for a plant's adaptability to strange conditions, rather than grumble at an occasional hard nut to crack in the way of cultivation.

The above, of course, was suggested by Mr. Bigland's recent article. Most people, I think, find *Asplenium viride* a troublesome plant to keep happy, but I thought I was alone in having some bother with *Lastrea rigida*. A variety of soils and situations in two or three different gardens has failed to produce a specimen one could proudly show to a friend, and the reason for the failure has not been apparent. Why a plant which has such a sweet tempered and indestructible appearance should give any bother at all in any position other than a bog, is a question our ecological experts have not yet answered. Its very restricted range of distribution in this country has given rise to a good deal of speculation on my part. Does it really need a limestone pavement to enable it to retain a place in our British Flora ? Admitting its need of lime, cannot it obtain and retain a hold on any calcareous rocks more than fifty miles from Ingleborough ?

This leads naturally to a further thought. Do ferns always grow where they want to, *in nature* ? One fears not. Ferns in some places are probably only to be looked upon as survivors of a byegone age, bravely struggling against adverse factors, being unable to alter their essential characteristics sufficiently quickly to adapt themselves to changed conditions. *Cystopteris montana* is a case in point. This is one of our rarest British species, eking out a precarious existence on wet exposed ledges on some of the highest Scottish mountains, growing with its rhizomes creeping through mats of moss, dwarfed and stunted, so that the fronds barely rise above their mossy beds. And yet, a recent writer tells us how it flourishes and attains a large stature under woodland conditions in Switzerland ! One cannot help feeling that the Ben Lawers plants are only struggling on their wet ledges because they have been hounded out of more congenial places by a relentless competition. It would be an interesting experiment to plant out a few specimens of this species in a quiet wood in North Wales or the Lakeland, in leaf-mould beds with the Oak Fern, and in the damper places affected by the Beech Fern. It might, quite conceivably, oust its neighbours, or at any rate settle down comfortably among them. I have seen it happily established on a shady rockery in the grounds of a lowland Yorkshire

Abbey, thus at least proving that a pure mountain air is not an absolute necessity for its health.

A further thought suggests itself. Does Nature always know best, and do best for her children ? One is sometimes advised to sow fern spores as soon as ripe, in imitation of Nature's method. But it might well be argued that spores are shed in late summer or early autumn because Nature does not know what else to do with them. The fronds are mostly due to die down soon after, and the spores must be scattered in good time. But what a waste ! Millions of spores are doomed to be smothered under a layer of fallen leaves, and so never to see the light of day again. Could the spores have been scattered in late spring on top of the decaying leaves, one would imagine a larger percentage of survivals. But perhaps Nature does not mean us to revert to the conditions of the Coal Age, when ferns and their allies monopolised the landscape. However this may be, the gardener can still sow his spores when he likes, so long as he is prepared to look after them, and the incredible infant mortality of the wild can be obviated by the forethought of the human being, who spends half his time fighting Nature and not always working with her.

S. P. ROWLANDS.

REMOVAL OF A COLLECTION OF FERNS.

During the spring of 1932, in view of a removal at a date then uncertain, it seemed advisable to get the ferns uprooted and replanted in advance ; and a start was made late in February and continued by hamperfuls until every root that could be found had been dealt with ; finishing some time during March, by which time or very soon after a few early fronds on one or two of the first removals were thinking of starting into growth : though nothing serious happened at such an early date.

From the very first it was obvious that the new garden had no natural fern corner and did not offer facilities for the construction of one, the only course open being to dump the plants in the most suitable border amongst herbaceous flowers, hoping that no bulbs would occur ; this was done in some anxiety, as a rabbit warren in a wood next to the garden threatened to be a nuisance—and was. A nesting rabbit soon after persisted in burrowing amongst my best *Polystichums* and a valued *Lastrea* or two and though ultimately prevented it was some time before the complete burial of a fine *P. aculeatum pulcherrimum* was discovered and the victim put in a hospital to be attended to later on ; and another rabbit made a determined effort to drive a tunnel under wire netting and my Beech Fern and *Cystopteris fragilis*, loosening the soil and (after being ejected) leaving the ground in a condition too tempting for a mole to resist.

At last, however, order was restored, and then the herbaceous inhabitants began to grow and give trouble, mainly by pushing stems amongst incipient fronds and distorting their symmetry or by keeping rain off or by causing too much shade, all this being inevitable from the involuntary position chosen : though the collapse of a large rambler rose bough on to some delicate *Athyriums* was perhaps hardly playing the game, and the cat's choice of the *Lastrea thelypteris* nook as a way into the wood had to be forcibly prevented.

In spite of all, the ferns have done wonderfully well, none of them having had any help except a good bedding in each case of leaf-mould, the soil being a very light clay with a great deal of large pebbly gravel which keeps the drainage excellent and allows a free access of water to the roots. *Polystichums*, *Athyriums*, *Lastreas*, *C. fragilis*, one or two *Aspleniums*, *Scolopendriums*, *Osmunda* and a *Struthiopteris* have all grown healthily in it and in some cases have attained considerable size ; even a small *Blechnum* or two more than doubling dimensions in the season.

The best *Blechnum* however was put on removal in a border which had been specially made for roses and contained a quantity of stiff clay imported on purpose ; the fern was given an extra amount of leaf-mould in a deep hole and though exposed to full sun has sent out fine barren fronds and eight fertile, thus succeeding far better than any *Blechnum* I have yet had. The only comparative failures have been the *Polypodiums*, which were set in a grassy bed (with leaf-mould) on a huge tree-stump on which *L. filix-mas* and *dilatata* already grew to a good size ; the plants are alive but have produced very few and poor fronds : and of course small *Asplenia* could not be tried in any of these situations and in fact are not represented in the collection at all. *A. viride* and *A. marinum* are in a Wardian case but cannot be called show specimens. A few roots failed to show any signs of frond product and were removed to hospital, being potted in loam obtained from a heap that had been weathering down for many years, and sunk in shady ground in the open ; a *corymbose Athryium* has completely recovered, a crested *Polystichum* almost so, and the rest are coming round except the rabbit-buried *P. aculeatum.* This has a number of living fronds that seem unable to unfurl. Finally, three seedling *Lastrea cristata* were planted in a small “ rockery ” formed in a big stone trough and are doing well ; a peculiarity has been noticed in the way their fronds begin uncurling, the tip instead of being upright like most *Lastreas* projects sideways in a sort of flat attitude so that it looks as if a small green caterpillar lay at the base of a frond previously fully developed, the upright position not being taken even when the uncurling has begun. And the fronds when perfect seem to have a great desire to adopt an arched or recumbent attitude as if top heavy. This would not matter if they grew amongst or on tufts of grass but rather spoils them when they lie on or near bare earth.

E. A. ELLIOT.

A MODIFIED METHOD OF SOWING FERN SPORES.

In the GAZETTE for December, 1928, a description of the method invented by M. Paul Kestner was given, in which fine sand and a little leaf-mould would play a large part. A variation in the vessels employed has proved so successful than an account may be of interest, otherwise the system is almost identical.

Dr. Stansfield some years ago recommended glass butter-dishes, and having several of these at hand I did not get glass tubes as in M. Kestner's method, but decided to use his sand and leaf-mould ; a little of the latter, about a teacupful, rubbed through a fine sieve, was well mixed with about four times as much white Calais sand obtained from a chemist, and the mixture was then well boiled. On cooling, it was found to be rather dry, so a very small amount of cold boiled water was added, and a day later the spores were sown, those from a frond of *L. pseudo-mas incisa* collected at Whitewell with Dr. Stansfield in 1931 being selected. Germination took place in nine days, in early June, and was unusually thick ; as M. Kestner says " every spore germinated" and produced a felt-like mass of prothalli, the sowing having been rather too close. Later on other spores toward the edge germinated too. Growth has been slow, partly through overcrowding and also through a delay in pricking out, but it has been healthy and a few signs of mould vanished spontaneously and in a day or so after appearance.

The " soil " has a tendency to dry out quickly but this is easily remedied, and the plan seems well worth trying on a larger scale.

E. A. ELLIOT.

SUCCESSES AND FAILURES.

The last issue of the GAZETTE contains some very interesting details of the successes and failures of our fern growers. Fern spores of the past season, 1931, sown on Agar Agar, in my own case have failed. I had four Petri dishes and I simply sowed these to check the results of six dishes that I had given to a friend with the spores for him to make a first trial. Five out of the six were failures, so it seems that failures must have been frequent of late.

Allosorus crispus, I think, has always been difficult. It usually fades gradually away in two or three years. Mr.

Drury's method seems radical, and I cannot think that this plant would like the topping of gravel. After several years of attempts and failures I have now some promising-looking plants which so far have increased in size a little each year. A hole is dug, lime free compost put in, the plant is then put in and a little compost sprinkled over the roots. A heavy flat stone is then laid on with the fronds coming outside the edges and so left. This so far is my nearest approach to success, but we will still " wait and see."

Asplenium Viride, both the ordinary and the forked forms from Ingleborough, flourishes exceedingly on my outdoor rock fernery—no trouble at all.

Lastrea rigida from the same place, though so averse from descending below a certain level, grows luxuriantly in any part of my fern garden, and I have one quite large plant. During the Kendal meeting we did a big climb up to the limestone to see this growing in great profusion ; its quantity and size was a quite remarkable sight.

Old age in ferns : I have some immense *Polystichums* that I know to be between 60 and 70 years of age. They came from the very fine fernery made by Mr. Anthony Parsons at Danesbury, near Welwyn, for Mr. Blake. I was quite a boy, and well remember its building, and when it was finished Mr. Parsons asked me to go and catch some fish to put into the small pond into which a tiny waterfall trickled. I caught the fish, and he gave me some ferns—I have grown ferns ever since. Seven or eight years ago this fernery was abandoned, and I bought a lorry load of these enormous old ferns, which were planted in an addition I was making to my fernery, and there they are still bravely carrying on. In those youthful days I had the advantage of knowing two local great fern men, Mr. Parsons and Mr. Fitt, the latter a most kind-hearted man, who greatly encouraged me in fern growing. His son still cherishes his father's very old ferns which are yet growing in the garden at the Frythe, near Welwyn.

THOMAS BATES BLOW.

HAPPY HUNTING-GROUNDS.

It is probable that ferns of some kind or other are to be found in almost very county of Great Britain and Ireland, but some of them are much happier places for the hunter than others. If lines be drawn from North to South through the maps of Scotland and England corresponding to 4° W longitude for Scotland and 2° W for England, it will be noticed that by far the greatest number of interesting finds have been made on the western side of these lines. Also that on the eastern side of them the best hunting is to be found near the sea and among the mountains. The proximity of sea, rivers, lakes or mountains is almost an essential for a good hunting ground. Another desirable feature is a comparatively thinly populated country since ferns are shy creatures and do not flaunt themselves on football fields nor in crowded streets. Trees are also a necessary part of the landscape in order to provide shade and shelter for the ferns. In short wherever shade, shelter, moisture, fresh air, peace and security are to be met with, there do ferns most abound. The geological formation and the nature of the soil are other important considerations. Ferns are to be found on every kind of soil and rock—slate, grit, granite, chalk or limestone—but the practised hunter knows that, other things being equal, more variation is usually met with on a limestone or chalky formation than in the non-calcareous regions. Nevertheless the latter are well worth hunting as it is there we find the beautiful *montanas*, the *Blechnums* and *Athyriums*, *Lastrea dilatata*, *Allosorus crispus*, the Oak and Beech Ferns, etc. The occasional hunter, however, who has little time to spare will probably be happier in a limestone or chalk country, or, perhaps better still, in a region where limestone and grit rock meet each other. Pembrokeshire is an example of a county divided into two parts, one of which is limestone and the other coal measures. Here the ferns on both sides of the dividing line stray, more or less, into a country which is foreign to them and so are stimulated to make experiments in variation which, possibly, they would not trouble to undertake if they were on their own soil. The visit which the members made to Pembrokeshire a few years ago was one of the happiest excursions, generally speaking, which the Society has undertaken. Almost everyone found something and several very interesting varieties were found, most of them in *angulare*, such as two or three *tripinnatums*, one very good *brachiatum*, one neat *acutilobum* and a *crispatum*. Some finds were also made in *Scolopendrium* and in *Polypodium vulgare*. The Society has only had one official excursion in Cornwall and that was "off the lime," and although many beautiful ferns were seen, very little was found in the way of varieties. The Lizard region is, at all events partly, calcareous and we may confidently look forward to an interesting time during our stay at Helston next July. We hope at least some of the northern as well as many of the southern members will be able to take part in the hunting.

The late Mr. Druery and the late Mr. W. Forster both successful hunters, thought that the hunting was better when the ferns were found in scattered patches rather than in great masses. It is probable that this idea may be founded on fact since the scattered groups indicate more varied conditions, while it is undoubtedly easier to examine the individual ferns when they are not too crowded.

We have, so far, barely mentioned Ireland but it is probable that the "distressful" country may offer the best hunting ground of all for ferns. As is the case in England and Scotland the West of Ireland is the most fertile in varieties, although almost any part of the country is, no doubt, worth a visit. It is many years since the Society paid an official visit to the Emerald Isle and, although we believe that no important find was then made, it is certain that many first-rate things have been found there, including *A. ff. kalothrix*, several beautiful *trichomanes incisums*, all the best varieties of *capillus-Veneris* (except *Cornubiense*), *Polypodium v. omnilacerum* and *P. v. grandiceps* of Clewarth and Forster, crested forms of *Ceterach* and the Roundstone *Scol. v. crispum* (one of the most distinct), to mention only a few of the many choice things which might be named. It is time that Ireland had more attention from fern hunters.

F.W.S.

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Harvard University (Gray Herbarium), Cambridge, Mass., U.S.A.
Horticultural Society, The Royal, Vincent Square, Westminster, London, S.W.
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Hawkings, George, Cressy House, Goldhawk Road, London, W.12.
Hall, Alva J., Victoria Nursery, Victoria Road, Harrogate, Yorks.
Hellyer, Alfred, Assistant Editor, *Amateur Gardening*, 148-149, Aldersgate Street, London, E.C.
Hollings, Frederick, 37, Garbett Street, Accrington, Lancs.
Kentucky University, Department of Botany, Lexington, Kentucky, U.S.A.
Kestner, Paul, F.L.S., Chailly Village, Lausanne, Switzerland.
Kaye, Reginald, Waithman Hardy Plant Nursery, Silverdale, Lancs.
Keall, B. H., 32, Rainsford Avenue, Chelmsford, Essex.
Kirby, Alfred, 7, Gordon Road, Roath, Cardiff.
Laurie, G. F., Laurel Villa, Kenmure Avenue, Bishopbriggs, Scotland.
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Perry, A., The Nurseries, Enfield, Middlesex.
Pickard, A., 2, Snow Hill View, Wakefield, Yorks.
Praeger, R. Lloyd, D.Sc., 19, Fitzwilliam Street, Dublin.
Parkinson, J. J., The Lodge, East Lodge Gardens, Enfield Chase, Middlesex.
Platten, E. W., Needham Market Horticultural Society, High Street, Needham Market, Suffolk.
Prince, Albert, 1, Burton Road, Tarporley, Cheshire.
Prince, W. H., 21, Forest Road, Tarporley, Cheshire.
Rugg, H. G., Dartmouth College Library, Hanover, New Hampshire, U.S.A.
Russell, Archibald, 4, Crossgate, Cupar, Fife, Scotland.
Rowlands, Dr. S. P., Abbeville, 42a, Beckett Street, Doncaster, Yorks.

Russell, L. A., Richmond, Surrey.
Reeves, Hugh, Honingham Hall, Norfolk.
Robb, W. W., M.B., J.P., C.C., The Limes, Irthlingborough, Northants.
Ransom, Francis, F.C.S., Newlands, Hitchin, Herts.
Ransom, R. F., Wymondley Bury, Stevenage, Herts.
Saorstát Éirann, The Controller, Stationery Office, Publication Branch, Dublin.
Scott, W. D. S., The Gardens, Government House, Bulawayo, S. Africa.
Scott, F. W., Tullibole Castle, Fossway, Kinross-shire.
Sheldon, J. J., F.L.S., Monkhams, Lower Road, Gt. Bookham, Surrey.
Stansfield, F. W., M.D., D.P.H., F.L.S., 120, Oxford Road, Reading.
Stansfield, Tom, M.B., B.S., 120, Oxford Road, Reading.
Sherrin, W. R., A.L.S., South London Botanical Institute, 323, Norwood Road, London, S.E.24.
Stevens, G. E., 36, Bedford Road, Horsham, Sussex.
Sinclair, James A., 57, Stradella Road, Herne Hill, S.E.24.
Smithers, Major A., Morleys, Great Hallingbury, Essex.
Stephens, Michael, Coverwood, Ewhurst, Surrey.
Sutcliffe, Robert, 21, Market Street, Burnley, Lancs.
Stinchcombe, H., 92, Dunbar Avenue, Foleshill, Coventry.
Stansfield, Miss Jessie, Broad Road, Sale, near Manchester.
Sudell, Richard, F.I.L.A., A.R.H.S., 4, Bedford Square, London, W.C.
Stephens, Edward J., Rose Lawn, Digswell, Welwyn, Herts.
Smith, Ewart G., 147, High Street, Christchurch, New Zealand.
Taylor, Mrs. James, Colomendy, Mold, N. Wales.
Thatcher, Mrs. E. J., The Manor House, Chew Magna, Somerset.
Thorrington, F. W., Sunnymead, Little Baddow, near Chelmsford.
Trotter, P. D., Leith Vale, Ockley, Surrey.
Walker, W. B., Cook's Hollow, Enfield, Middlesex.
Warren, James, Flat 2, 13, Bruton Street, London, W.1.
Waterhouse, Alfred, East View, Warton, near Carnforth.
Weiss, Professor F. E., Easedale, Woodway, Merrow, Guildford.
Westley, Edwin, 2865, Nina Street, Lamanda Park, Pasadena, California, U.S.A.
Whiteside, Robert, 51, Borrowdale Road, Lancaster.
Willmott, Miss E. A., V.M.H., F.L.S., Warley Place, Great Warley, Essex.
Williams, J. C. (Life Member), Caerhays Castle, St. Austell, Cornwall.
Wiper, Ernest, 720½, Yates Street, Victoria, B.C., Canada.
Wood & Son, F.R.H.S., The Nurseries, Taplow, Bucks.
Woodcock (His Honour, Judge) H. Drysdale, K.C., Lypiatt Park, Stroud, Glos.
Wynch, Mrs. Violet A., F.R.H.S. (Life), Pine Hill, Camberley, Surrey.

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THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

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Further particulars may be obtained from the Hon. Secretary,

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

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EDITORIAL NOTES.

Our talented and energetic member, Miss Irma Andersson-Kottö, of the John Innes Horticultural Institution, who has previously done much good work on the genetics of ferns, has sent us a further paper, which has been published in "Svensk Botanisk Tidskrift," on the "Inheritance of Apospory and Alternation of Generations," and which we reproduce with the author's permission. So far as fern-growers generally are concerned, the main subject is a set of individuals which have been raised from the spores of a *Scolopendrium* (*Phyllitis*) which, she says, came to her as var. *crispum muricatum*. These seedlings Miss Andersson-Kottö has, for convenience, called "peculiars." This peculiar type attains only a height of 8 centimetres (about 3 inches) and requires to be cultivated under a bell-jar. The fronds are approximately of the normal outline, but never develop sori or sporangia and their texture and structure is like that of the prothallic generation. The frond thus consists only of prothallial tissue with the *Scolopendrium* venation. Gradually the whole edge, or part of it,

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grows out into prothallia with normal sexual organs. The latter give rise to similar individuals, the process being repeated in the following generations. The characters of these " peculiars " would seem to be closely comparable to those of *P. angulare prothalliferum superbum*, H. Stansfield, and of *P.a. plumosissimum*, Birkenhead. These latter, however, eventually grow out of the prothalloid state and become ordinary sporophytes if gradually inured to a drier atmosphere. Indeed, *plumosissimum* has now done this completely and, so far as we know, only exists as a *plumose divisilobe*, while the other seems to be approaching the same condition. We have raised several *Polystichums* of this type which seemed to consist entirely of prothallic tissue (except for the skeletal framework), but these, with one exception, have died under the test of being inured to open air conditions. Miss Andersson-Kottö has also tried to acclimatize her " peculiar " *Scolopendriums* to a drier atmosphere, but has, so far, not succeeded in this endeavour. We have visited the John Innes Institution and examined the " peculiars," which seem to be clearly analogous in structure and behaviour to the *Polystichums* above mentioned. Miss Andersson-Kottö is now experimenting with *prothalliferum superbum*, which seems to be flourishing under the same conditions as the " peculiar " *Scolopendriums*. We have appended to the paper, as published, a short glossary of some of the technical terms which we trust may make it more intelligible to some of our Greek-less readers.

The Southport Flower (and Fern) Show will be held as usual about the last week in August and will be well worth a visit from all who are interested in horticulture. The Editor expects to be there and hopes to have the pleasure of meeting some of the members who may not have been able to attend the annual gathering of the Society in the previous month. There will be more time than usual for friendly conversation as members will not be under the necessity of hurrying off to meetings and excursions. The Show will be, in fact, a meeting in itself.

OUR FRONTISPIECE.

Cystopteris alpina crispa, Kestner.

The illustration is from a plant collected by M. Kestner in Switzerland at 6,900 feet and sent by him, in 1930, to the Editor, in whose garden it has developed into a good clump and still shows all the original characters both specific and varietal. It is, however, slightly less compact than when first received owing to cultivation under glass. Mr. Greenfield's plant found in 1931 at Kandersteg at about the same altitude is very similar and the two plants are now scarcely distinguishable. The forma *dissecta*, collected by Mr. Waltham above Geneva in 1926, remains perfectly distinct as when first received and the character is as well preserved in the seedlings as in the original plant, both under glass and in the open.

OBITUARY.

BICKHAM.

We regret to announce the death of Mr. Spencer H. Bickham, J.P., F.L.S., of Underdown, Ledbury, an eminent field botanist who, although not a fern specialist, has long been a member of our Society. He did not attend the meetings, but read the GAZETTE and occasionally corresponded with the Editor on botanical subjects. He was a friend to many botanists.

HENWOOD.

We have also to announce the death, after a formidable operation for chest disease, of Mr. Charles Henwood, who at one time acted as Hon. Secretary of the Society. He was never married and our sympathies are with his father, our venerable Vice-President, Mr. T. E. Henwood who, happily, is still with us.

THE ANNUAL MEETING.

The Annual Meeting will, this year, be held at the Angel Hotel, Helston, Cornwall, at 10 a.m., on Monday, July 3rd (*not* July 4th as was erroneously announced in the December Gazette). Members are advised to arrive at Helston not later than July 1st (or even June 30th should this be convenient) so as to have time for a preliminary consultation and look round. Visitors are requested to make application if possible at least a fortnight before the time of their arrival, letters being addressed to the proprietor, Mr. R. H. Fisher. The locality chosen is doubtless rather remote for many members, but we trust this drawback will be compensated by the change in the scenery and vegetation and the greater probability of fresh " finds " than in the more frequented localities which have been previously explored. We hope to have a fair attendance of members both from the South and North. Our member, Mr. J. C. Williams, Lord Lieutenant of Cornwall, has kindly invited us to see his woods and gardens at Caerhays Castle if a visit can be arranged while we are in the " Duchy."

OBSERVATIONS ON THE INHERITANCE OF APOSPORY AND ALTERNATION OF GENERATIONS.

By IRMA ANDERSSON-KOTTÖ.

The work on apomixis and apospory is very extensive. Morphological and taxonomic studies on the one hand and cyto-embryological studies, particularly of the school of Rosenberg, on the other have brought to light various importants facts which have not only made possible extensive conclusions but have given rise to speculations in various directions. Among the more general questions which have arisen and which are here of special interest are those relating to :

(1) the cause of apomixis and apospory ;

(2) the relation of polymorphism of plant genera to apomixis and apospory, or generally the role played by axomixis in evolution and species-formation;

(3) the relation of apomixis to polyploidy;

(4) the alternation of generations.

It is impossible here to go into the extensive literature on the subject and it is only necessary to refer to the recent handbook by Rosenberg (1930). It may be mentioned that, in addition to speculations on hybridism in itself as the cause of apomixis, whether on cytological (Winge 1917) or comparative (Ernst 1918) grounds, more definite views have been expressed on this subject by Rosenberg (1917), Winkler (1920), and more especially by Holmgren (1919) and Rosenberg in his later work (1930); these authors have been conscious of the possibility of a genetic factor for the tendency to apomixis, and have expressed themselves to this effect.

In the ferns, in all cases previously investigated, obligatory apospory has been associated with apogamy or with parthenogenesis.[1] That the processes need not occur together, however, appears from cases of induced (non-inherited) apospory, e.g. in *Polypodium aureum* (Heilbronn 1927). In the Angiosperms likewise the rule has so far obtained that obligatory somatic apospory is followed by apogamy or parthenogenesis. The material has thus not been suitable for a genetical investigation, even in the partly apomictic *Hieracium* species which were tried by Ostenfeld (1910).

Genetical and cytological facts bearing on these and related problems have been furnished by Beadle and McClintock for *Zea Mays* in a preliminary note (1928) and a further report (1930). These authors found a mendelian recessive gene for failure of synapsis of the meiotic chromosomes. The asynaptic plants were apparently completely pollen-sterile and the female sterility was variable. Gowen (1928) has also given facts which indicate that there is a recessive gene in *Drosophila* which causes aberrant meiotic chromosome behaviour, and further Blakeslee (1928) mentions a recessive gene in *Datura* for failure of synapsis at meiosis.

---

[1] This rule is not contradicted by a case like that of *Nephrodium pseudo-mas* var. *polydactylum* where the sporophyte arises from fusion of somatic nuclei in the gametophyte, and reduction occurs at spore-formation.

In my material of *Scolopendrium* obligatory somatic apospory occurs without apogamy, i.e. apospory together with normal sexual reproduction, and since in a fern the stages at which the respective processes occur are widely separated in the development of the plants, the material can easily be investigated.

Since the aposporous *Scolopendrium* sporophytes under consideration are of very striking appearance, they are for convenience called "peculiars." The peculiar type of sporophyte attains only a height of 8 cm. and may bear as many as 25 small fronds at one time. It is very tender and thrives only under glass bell-jars. Though possessing most of the organs of a *Scolopendrium* sporophyte it differs from the normal type and from all known varieties of this species in several respects. The fronds never develop sori or sporangia, and there is, except for the vascular system, no differentiation of tissue in the leaf-blade, all cells being straight-walled and similar to those of the gametophyte. Occasional stomata are found. Fully-grown fronds are several cell-layers thick except at the edge. The leaf-blade thus consists of only prothallial tissue beside the *Scolopendrium* venation.

Gradually the whole edge, or parts of it, grows out into a prothallium with normal sexual organs. The latter upon fertilization give rise to similar sporophytes, the process being repeated in the following generations. Though the nuclear size increases in successive sporophyte generations of the "peculiars," neither chloroplast size nor cell size does so. The prothallium-like cells of the leaf-blade, especially those situated towards the basal part of the leaf-blade, are larger than those of the prothallium. The cell-size is, however, gradually adjusted to the normal as the frond grows out into the prothallium. This applies to all generations investigated, G, F_1, G_1—F_4, G_4. More easily comparable organs in the various generations, such as archegonia and antheridia, also show no differences in size, nor does the size of the whole sporophyte or of its organs increase, either in the normals or in the "peculiars."

If we consider apospory in the wider sense we have thus in ferns cases where, through apospory, the gametophyte generation arises at various stages of the sporophyte : from unreduced spore mother cells, from cells of young sporangia or the receptacle, from isolated cells of the apex, margin or surface of the frond and finally here from the entire lamina, the time at which the gametophytic generation originates in our case being intimately connected with the early differentiation of the entire lamina.

The "peculiars" arose from the spores of a normal sporophyte of the var. *crispum muricatum*. This normal *crispum muricatum* sporophyte was homozygous except for the peculiar character, in which respect it was a simple heterozygote. The sporophyte in question was obtained from a private collection, its origin being unknown.

This *crispum muricatum* parent sporophyte gave rise to 90 "normals" and 29 "peculiars," a ratio indicating that the peculiar character is determined by a single mendelian gene, normal being dominant over peculiar. These "peculiars" gave again "peculiars" as described above. The normal were, as expected, either homozygous or they segregated like the parent, two plants of the latter category giving respectively 147 "normal:" 50 "peculiar," and 139 "normal:" 41 "peculiar," which is a close approximation to the expected 3:1 ratio. Further support for the single factorial difference between these two types has been obtained from crosses between this original *crispum muricatum* plant and other normal *Scolopendrium* varieties, e.g. one hybrid, A, thus derived gave an F_2 family of 181 "normals," 64 "peculiars," and later another family was raised with 88 "normals" to 30 "peculiars." Again, some of these "normals" were homozygotes, others segregated and gave respectively 107:43, 151:44, 103:30, 117:34, 102:30 and 99:39 "normals" to "peculiars." Moreover, the gametophytic ratio of 1:1 was proved by self-fertilization of single gametophytes (G_1) from the F_1 sporophyte in this family. Of the 59 G_1 gametophytes which were isolated for this purpose, 23 gave "normals" and 27 gave "peculiars." Nine died or were discarded. Fourteen of these G_1 gametophytes were derived from one sporangium. Five of them gave normal sporophytes and 9 gave "peculiars," which shows that a single sporangium gives rise to both types, as would be expected.

From another hybrid, B, between the same *crispum muricatum* and another variety no ratio was obtained in F_2, but again one F_2 sporophyte was homozygous, while another was heterozygous and gave a small F_3 family consisting of 13 "normals" to 6 "peculiars." The F_4 here raised from 2 F_3 "normals" was normal. From 3 other F_3 "normals" the F_4 consisted of 79:23, 117:45 and 118:41 "normal" to "peculiar" respectively.

The third hybrid, C, obtained in the same way gave the less satisfactory F_2 ratio of 32 "normals" to 5 "peculiars."

Some other hybrids between this *crispum muricatum* and other varieties gave no segregation for "peculiar," since *crispum muricatum* is heterozygous for the character in question.

The peculiarity is inherited both on the ♀ and the ♂ side.

I think it amply proved that the "peculiar" and the "normal" differ in a factor which segregates in the typical mendelian way, "normal" being dominant over "peculiar."

As mentioned above, the "peculiars," selfed or crossed with "peculiars," give in successive generations "peculiars" again. Since apospory here is not correlated with apogamy, the chromosome number of the "peculiars" rises in each successive sporophytic generation. The higher polyploid "peculiars" are also recessive to "normals," as is shown by the normal appearance of sporophytes from crosses between higher polyploid "peculiars" and "normals." The higher polyploid normal sporophytes, i.e. those with more than one complement of "peculiar," obtained by crossing "peculiars" of F_2, and later generations with "normals," only develop sporangia up to a certain stage.

Neither the plant of the variety *crispum muricatum* from which I obtained the factor, and which was heterozygous for it, nor the F_1 normal plants from the crosses have, as far as investigation has shown, any gross disturbance at reduction, nor have the normal F_2 sporophytes any such disturbance. The gametophytes of the F_4 "peculiars" (which is as far as I have got) are functioning in respect of sexuality as well as did the gametophytes of the parents and F_1, and crosses with normal *Scolopendrium* varieties succeed as easily as in any of the generations.

* * * *

The new data offered in this paper have a bearing specially on the points 1-4 previously mentioned, these points to be discussed more fully elsewhere. We may conclude from these experiments that apospory is, like other characters genetically investigated, determined by a gene. Apospory is recessive to normal development with spore formation and reduction in the sporangium. Since no normal sporophytes with apospory have been found in these experiments, apospory is here intimately connected with the "peculiar" type and the entire development of its fronds. It is of interest then, especially from the evolutionary point of view, that a single gene mutation may thus be sufficient for the loss or gain of the normal high development of the frond, sorus, sporangium formation and meiosis at the spore-formation.

The relationship of polymorphism to apospory is elucidated by the fact that the gene for apospory recombines with other genes, such as those for different normal types of shape of frond, venation, type of sorus, etc. (to be discussed more fully elsewhere). Furthermore, apospory, being determined by a single gene, may have arisen early in the formation of genera or repeatedly at a later stage.

By analogy with other genes the gene for apospory, which is recessive in our case, may be dominant in other plant genera, and we may also expect, for instance, complementary factors to occur.

Finally, it may be mentioned that a more or less regularly increasing polyploid series like that obtained in successive generations of " peculiars " may be of evolutionary importance since the differences in the numbers of chromosomes may provide greater chances for successful interspecific and intergeneric hybridization.

The series Algae-Mosses-Ferns-Angiosperms shows the well-known increase in organization of the sporophyte generation and a corresponding diminution of the gametophyte generation. A type like the " peculiar " fern here discussed is therefore of interest, since it constitutes a compromise between a sporophyte and a gametophyte, the demarcation between sporophyte and gametophyte being pushed backwards in the life-cycle until the gametophyte appears as an organ of the sporophyte.

The usual sporophyte may be held to be more suited to the ordinary life on land than is the " peculiar " type, since the former has a more robust habit, differentiated tissue and abundance of spores which require dry air for their dispersal. The latter, with its prothalloid fronds, is of a semi-aquatic type. If we must consider the origin or increased development of the sporophytic generation in ferns in relation to early terrestrial life or a transmigration to land, the " peculiar " type strikes one as eminently suited to life in shallow water. It is permissible to contemplate the early ferns, or some of them, as of a similar type, at least at one time or another. Possibly, then, the acquisition of the higher organization of the sporophyte and more especially the acquisition of the habit of spore-formation and meiosis at spore-formation were subsequent mutations.

The origin and evolution of the fern sporophyte and of such comprehensive groups as the ferns is probably more complicated than has been generally admitted, and the point above has only been mentioned since the " peculiar " type shows one of the possibilities of an earlier type of fern sporophyte as much as the frequently advocated reverse one, i.e. the elaboration of a more and more highly developed sporophyte through sterilization of pre-existing sporogenous tissue (e.g. Bower 1890, 1923-28, 1929).

The discoveries in Algae and the comparative studies, especially by Svedelius (1921, 1927, 1931) have shown that the increase of the sporophytic generation and the simultaneous decrease of the gametophyte in the land plants is probably not entirely due to the migration of plants to land. Svedelius emphasizes the evolutionary importance of a delay of the reduction division in the life-cycle. Meiosis at a later stage of the sporophyte generation, i.e. at spore-formation, is contrasted with meiosis soon after fertilization in the zygote, the former held to be of greater advantage, since numerous reduction divisions compensate for one fecundation. The latter process (meiosis early in the zygote) is of less advantage since here one fecundation is followed by only one reduction division. The higher survival value of the former type, as was first pointed out by Svedelius (1921) would be due to the numerous possibilities of chromosomal recombinations which are realized at meiosis.

In the ferns here under consideration we cannot contrast reduction at spore-formation with reduction early in the zygote, i.e. the important shift so frequently occurring in the algae. On the other hand, we can contrast reduction at spore-formation with a process, which probably is a reduction, at gamete-formation, since some of the " peculiars " show that a reduction of some sort occurs in the antheridium. Though the ecologically important character of spore-formation is lost, the " peculiars " would thus still have one fertilization to several reductions.

The full data bearing on this point will appear elsewhere. In this place it will only be mentioned that, if this process proves to be a reduction of some sort, the place where it takes place, viz., the antheridium, is entirely new for ferns. Hence we should have the same type of alternation of nuclear generations as occurs in *Fucus* and which is characteristic of Angiosperms, i.e. reduction immediately followed by fertilization, in contrast to the ferns in general, with their separate many-celled stage, the haploid gametophyte generation, between the two processes. The case would also be the reverse of that occurring in those algae which have fertilization immediately followed by reduction. Though having a morphological alternation of generations which might possibly be considered as more primitive than that in the present-day ferns, the nuclear alternation (on the ♂ side) and the duration of the two nuclear phases respectively would correspond with that in the highly organized Angiosperms, the morphological and the nuclear phases here only partly coinciding.

I am indebted to Miss A. E. Gairdner for the cytological work, which will be described in detail later.

John Innes Horticultural Institution,
Merton, London.

25th November, 1931.

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GLOSSARY (APPENDED TO MISS ANDERSSON-KOTTÖ'S PAPER).

APOGAMY : a sexual propagation from the gametophyte or reproduction of the sporophyte from the prothallus by budding without fertilization.

APOMIXIS : propagation without fertilization as in parthenogenesis.

APOSPORY : production of a prothallus directly from the sporophyte without intervening spore formation.

AXOMIXIS : union of non-sexual cells by fusion of nuclei as in " bud-sport " formation.

CHROMOSOMES : the chains of microscopic bodies in the nucleus of a cell which govern the character of the cell and of other cells produced from it.

GENE : the fraction of a chromosome which carries one hereditary character.

GAMETOPHYTE : the sexual phase in the alternation of generations ; in ferns the prothallus.

HAPLOID : having the normal number of chromosomes as opposed to polyploid.

MEIOSIS : splitting of chromosomes which occurs every time a cell divides.

PARTHENOGENESIS : production of young by a female without fertilization, as e.g. the laying of drone eggs by the unfertilized queen bee.

POLYPLOID : having an extra number of chromosomes owing to successive fusions of cells without reduction.

SPOROPHYTE : the asexual phase in the alternation of generations ; in ferns the fern proper as distinct from the prothallus.

SYNAPSIS : union of cells by junction of their protoplasmic processes.

ZYGOTE : an individual produced by the union of two germ-cells.

SPORES : THE DISTANCES THEY TRAVEL.

Though I have read, and possess, all the volumes of our Gazette I do not recall anything about the distances spores travel in search, so to speak, of a site where they can germinate. I suppose there are myriads of spores everywhere and only a few happen to come to rest in suitable places. This article will not concern itself with fernlets which come up freely in the neighbourhood of their relatives. With one exception, worth noting for another reason, I shall confine myself to species which have travelled. The seedlings are, to me, the more interesting on account of the rather curious home which three species have chosen. My greenhouse, a lean-to, faces south-east ; its back wall consequently looks north-west. It is of concrete, ten feet high, and a dense hedge two feet away, rises to nearly the same height. In this concrete wall many small cracks, making tiny fissures, have come. Most of them will not admit the small blade of a pen-knife—none will admit, easily, a large blade. They seem quite shallow ; nevertheless these cracks, strange as it may appear, have furnished pleasant homes for spores. One of the ferns now growing in this seemingly inhospitable position is Italian Maidenhair. As I was being shown over the remains of the palaces of the Caesars in A.D. 1900 my guide gathered a few specimens ; they have flourished inside the greenhouse and, somehow, spores have escaped and germinated on the back wall. I mention them because it is very unusual for any *Adiantums* to thrive in the open. This winter it is the more remarkable because we have had a long succession of frosts. But there are two other species, very much at home on the wall, whose presence can only be explained by long travel. *Asplenium Ruta-muraria* has never been grown in Cedar Mount. In a neighbouring place, some 220 yards away, I have seen a few small plants ; further off, 440 yards, it grows freely. Doubtless my now flourishing colony came by spores from these sources. The journey was perilous and troublesome ; thick hedges, dense conifers, forest trees, high walls all had to be conquered before the spores found rest in my hedge—sheltered concrete fissures. Even more puzzling is a group of Harts-tongues. Many " *Scols.*" grow in my ferneries and they spore freely. But this wall group differs from anything in the place. It may be termed *subcrispum*. The only explanation which occurs to me is that the unaccustomed situation and rigorously confined root-run caused ordinary spores to develop into a variety [?—*Ed.*] Another case of spore travel is the way *Cystopteris fragilis* has invaded the greenhouse. Over thirty years ago I collected specimens near Grindelwald and planted them in an outside fernery, where they died out in a year or two. *Cystopteris* can be grown here without glass, but it demands carefully planned shelter. But, though the original plants died, their spores survived, found their way to the greenhouse, where they germinated and have been exceedingly happy. The distance travelled is not, in this case, great—about 110 yards ; but the obstacles are serious—thick shrubberies, high hedges, herbaceous borders, and many fruit trees had to be safely passed before the open door, or open lights, of the greenhouse could be entered.

H. KINGSMILL MOORE.

February, 1933.

[Canon Moore's experiences are by no means unprecedented as regards the distances travelled by spores by natural means. *Asplenium Ad. nigrum*, *A. Ruta-muraria* and occasionally *A. trichomanes* have been found on walls in Reading in situations miles away from the nearest habitats of the species. *Pteris aquilina* comes from even greater distances, but the plants cannot reach maturity in these situations and the small seedlings are generally not noticed or not recognised unless by an expert. We once found, in a narrow alley in the heart of the town of Faversham, three species growing on the same wall, viz., *A. Ruta-muraria*, *Lastrea filix-mas* and *Pteris aquilina*. The *Asplenium* seemed fairly happy, the male fern was very much stunted, and the bracken consisted of small seedlings which could obviously not survive an ordinary summer season in that situation. Quite recently we observed, in the busiest street in Reading, a considerable colony of small ferns mainly, if not entirely, consisting of *filix-mas* and *Scolopendrium*. A narrow recess had been left in the brick wall in order to accommodate the pipe which conducted the water from the roof to the underground drains, and, in the narrow chinks on each side of the pipe the ferns were growing on the damp surface of the brickwork. They will probably not survive the next long spell of summer drought, but fresh spores will arrive in the autumn and recolonize the situation. It is by no means inconceivable that the plants of *Cystopteris alpina* found by the late Mr. James Backhouse in Teesdale may have sprung from spores brought by high winds from Norway, nor that the plants of *Adiantum capillus-Veneris* found in Morecambe Bay by Mr. W. H. Stansfield as recorded in our last issue, have originated from spores carried by winds from, say, the Isle of Man where the species is known to occur. *Phyllitis Scolopendrium*, when growing on walls with scanty nourishment, is often seen to put on a sub-crispate or undulate character in the young state, but the ferns, when removed to a more sheltered position with abundant nourishment, generally revert immediately to the normal flat type.—*Ed.*]

POLYSTICHUM ANGULARE PULCHERRIMUM VARIEGATUM, MOLY.

This remarkably beautiful fern, which was found in Dorset by the late James Moly, is now very uncommon—it is doubtful whether half-a-dozen examples could be found among all the extant collections. When first found it was fairly vigorous, producing numbers of bulbils (one or two on a frond) from which young plants were raised characterized by a peculiar squareness of the pinnulets which gave them a most distinct appearance. They only developed fully the beautiful orange and dark green variegation and lax *pulcherrimum* character as the plant reached maturity. The original plant was marred by occasional depauperation in some of the fronds. Several plants have been raised from the original by apospory and from spores, all, so far as is known with one exception, proving inferior to the parent. Dr. Stansfield was successful in raising the one perfect form. It is free from depauperation and produces spores, but the variegation is not quite so bright and definite as in the original plant. The original, however, was in good form in Dr. Stansfield's collection in 1932 when it bore 10 or 12 fronds, several of which were 3 feet in length, all perfect in outline with the rich golden and dark green variegation wonderfully developed. Some years ago, my division of the original plant having produced a wealth of spores, I made several sowings and raised a large number of plants, many of which were distributed. From the first sowing came two plants of extraordinary vigour resembling Moly's *plumosum* but showing, so far, no sign of variegation. From the second sowing I retained a dozen to ascertain whether they would develop variegation. Most of them soon assumed the parental depauperation and *pulcherrimum* character, which latter feature is not entirely constant, but varies in degree from year to year. Three, however, are quite free from depauperation, but in none did any sign of variegation appear until three years ago, when faint traces of variegation were visible on a few fronds. The variegation was much more pronounced last year and I am looking forward and hoping for the time when they may become as fully variegated as the parent. I would suggest that others possessing plants of this unique fern should try raising plants from spores in the hope of obtaining a vigorous and richly variegated form—a prize worthy of the effort.

W. B. CRANFIELD.

[Mr. Cranfield's admiration for the original *variegatum* of Moly is fully justified. It is indeed one of the most beautiful and distinct of British ferns, but, alas ! also one of the most difficult. During the forty-odd years I have grown it I have distributed scores of plants raised from the bulbils which were formerly fairly freely produced (though never in large numbers), but, so far as can be ascertained, most of these have died. I have myself rarely had more than two plants at a time and have now only one, which, however, as indicated by our President, was last year in better character and apparently more vigorous than it has ever been before. For the last half-dozen years, however, it has quite ceased to produce bulbils and has so put a stop, for the present, to the prospect of any further distribution of the original. The seedling, however, to which Mr. Cranfield has referred, has produced spores from which a fair number of promising seedlings have been raised and some of these have already been distributed, though none of them is as yet mature. The great point about this plant is that it seems to have completely abandoned the bad habit of producing depauperate fronds and this reformed character is transmitted to its offspring. This is, in itself, a great gain. The seedlings inherit the *pulcherrimum* character in varying degrees, though they all seem to show it more or less. They also mostly shew traces of variegation, but I have not yet seen one equal to the original wild " find " in this respect. It remains to be seen what they will be when fully mature. Unfortunately, the original " improved " seedling almost committed suicide in 1931 by trying to start growth in October and this " spent its strength for naught." It is still alive but looks feeble and will require much nursing before resuming its former vigour if ever it can be persuaded to do so. The children, however (grand-children of the wild " find ") remain, and it is hoped that these may again produce offspring and so in time reproduce the glories of the original " find." " Instead of thy fathers thou shalt have children whom thou mayst make princes in all lands."—*Ed.*]

NOTE ON ASPLENIUM GERMANICUM.

Towards the end of February this year it was noticed that two plants of this fern, which had recently been bought and potted up, were in a constantly drooping condition ; at first it was thought that a dose of water would improve matters, but in spite of a slight attempt to revive their condition remained clearly very poor, and immediate change of treatment seemed very necessary : so their potting was next reconsidered, but nothing in theory seemed wrong with that, as it had been done on the most approved conventional lines in pots specially made for ferns, some three inches or so across and rather less in depth ; a few drainage crocks going in first, then a thin layer of fibrous peat, and on top of this a number of small sandstone lumps varying from the size of a pea to that of a chestnut.

A little soil, mainly leaf-mould and sand, was next added, and the fern's roots laid on this sideways ; the width of the pot was sufficient to allow this position of the roots to be away from the side of the pot and yet to bring the fern crown in the pot's centre : and a sprinkling of the same compost on the roots, with more sandstone lumps wedged gently but firmly down, completed the planting.

So, as this was still thought to be satisfactory, the only other reasons for the trouble were taken to be, either woodlice or some such pest or unsuitable surroundings ; and as a thick layer of grease had been put on the saucers (*not* on the pots), the pest danger appeared unlikely and the second alternative more probable. The ferns were in an attic, not too well lighted, and often at a temperature very close to freezing point : they were taken out and put in a sunny garden frame, in a corner least exposed to direct sunshine ; the frame was being slightly heated, probably never going above 50 degrees or far below 40, and the heating apparatus being home-made and providing a distinctly *moist* warmth. The result was surprising ; the ferns revived in a few hours, began to send up new fronds in a few days, and during a month's trial of this plan have only flagged twice, a state remedied at once by a good drink, care being specially taken to keep the crowns dry. The second of these occasions occurred in late March, on a hot day, and is taken as showing that the frame is getting too warm and that removal, at least by day, to a cold frame is advisable.

This all leads one to think that *A. Germanicum* is one of those real Alpines which need, either a deep coating of snow in cold weather, or a milder climate than ours ; its European distribution rather bears this out.

It is remarkable that a plant of *A. septentrionale* has remained in the attic, potted in the same way, quite unmoved by the cold and only asking for an occasional drink : its new fronds are almost as far advanced as those of its more particular cousins.

E. A. ELLIOT.

[Alpine ferns, and alpine plants generally, are protected by snow in winter, not only from frost, but also from evaporation, consequently they suffer neither from cold nor from drought, but have complete rest and are ready to start into vigorous growth as soon as the snow melts. A covering bell-glass would probably have prevented our correspondent's *Aspleniums* from drooping during the winter in the dry air of the attic where they were stored.—*Ed.*]

WOODLICE AMONG FERNS.

These vermin are not usually regarded as very terrible enemies by fern growers and it is true that they are less deadly than the Otiorrhrynchus, less spectacular in their devastations than the various species of slug and snail, but nevertheless in situations where the soil is light and gravelly they often become a serious nuisance. To such ferns as require a dryish or stony soil they can be very destructive. They will eat away the rhizomes of *Polypodies*, especially under glass during the winter, and will gnaw off the young and tender fronds in the spring and summer. To *Aspleniums* of the alpine and subalpine section they are exceedingly dangerous as they will not only eat the young fronds but will completely destroy the crowns and even the roots where these are accessible. Such species as *A. septentrionale* and *Germanicum* and even *trichomanes* can be easily killed by them during the resting season when the ferns are supposed to need less care than in the growing period. Choice kinds of *Cystopteris* and all the *Woodsias* are liable to their depredations and the varieties of *Scolopendrium* are devoured at all seasons of the year, but particularly when the young and tender fronds are developing. The only defence is constant vigilance and trapping, and the latter process is most easily achieved by hemispheres of orange peel placed concave side downwards among the plants. Under these domes the woodlice find both food and shelter, and I have frequently found the interior of the hemisphere completely lined by them in the morning. During the day the "lice" usually retire to deeper lairs where they are out of sight and out of reach. Great numbers can be destroyed by going round before breakfast and picking up the pieces of peel; a smart tap on hard ground dislodges the vermin and scores at a time can be crushed under the boot. It will also be found that the soil which has been covered by the peel is often partly covered by a layer of woodlice which begin to disperse and seek other shelter as soon as their roof is removed, and considerable quickness of sight and hand is needed to secure them before they disappear. Slugs are often found among the woodlice and in damp weather are usually the prevailing "bag" instead of woodlice. I have also not infrequently found one or two specimens of *Otiorrhrynchus* under the hemispheres, but one needs to hunt early in the morning for these as they are much more cunning and suspicious than either woodlice or slugs. Frogs and toads, where these can be procured and retained, are a great help in the fight against vermin of which they will eat large numbers, especially of the smaller specimens. Hedgehogs also eat woodlice, but they are not easy to keep in captivity as they can scale walls by means of the climbing plants and fruit trees which usually cover them. Woodlice as well as slugs can be poisoned by a thin surfacing of bran mixed with

"London purple" or "Paris green" (both arsenical preparations), but I am reluctant to use these wholesale methods as they destroy not only our enemies but also our friends the carnivorous slugs (*Testacella*) and beetles which normally act as a check, not only upon young slugs and woodlice, but also upon the much more deadly *Otiorrhrynchus*, whose larvae live entirely underground and so escape scot-free from the arsenical poisons. It is also possible that frogs and toads may be killed by eating the woodlice and slugs, which have partaken of the poison. Cabbage and cauliflower leaves are also effective as traps for slugs, but are less so for woodlice as they do not give such complete concealment as the orange peel.

F.W.S.

A FERN CENSUS.

It has been suggested to us that, in view of the absence of any national collection of British ferns (*pace* Kew and Wisley) and the disappearance or shrinkage of some of our trade collections, we should from time to time make a record of such collections as still remain, especially of those forms which are in danger of disappearance, in order that we may at least know where these are to be seen, if not where they may be procured. Unless some such record can be made there is a real danger that choice varieties may become extinct as some of them have probably done already. A thriving fern nursery is a valuable reservoir from which depleted collections can be restored and lost treasures replaced but we have now not many of these left and there are not even so many large private collections as formerly, so that it is in every way desirable that the whereabouts of choice and rare ferns should be generally known. If members will be good enough to send us lists of their ferns, not necessarily complete but especially of the more rare and difficult varieties, we shall be glad to publish abstracts of them from time to time for the general benefit. The Editor has plants of the following ferns, most of whch are believed to be rare or at least uncommon in cultivation :—

Adiantum Cap-Veneris imbricatum..
Asplenium Adiantum-nigrum grandiceps.
,, ,, ,, *microdon.*
,, *trichomanes bipinnatum*, Roberts.
,, ,, *confluens*, (2 forms).
,, ,, *incisum.*
,, ,, ,, *Clementii.*
,, ,, *cristatum*, Rowlands.
,, ,, *serrato-constrictum*, Smithies.
,, *viride plumosum*, Greenfield.
Athyrium alpestre cristatum, Cowan.
,, *f.f. acrocladon*, original.
,, ,, *caput-Medusæ*, Mapplebeck.
,, ,, *Clarissima*, Moule (original).
,, ,, *congestum minus cristatum.*
,, ,, *fimbriato-cristatum*, Garnett.
,, ,, *Kalothrix cristatum*, H.S.
,, ,, ,, *lineare*, H.S.
,, ,, *plumosum*, Horsfall (original).
,, ,, ,, Mrs. Hodgson.
,, ,, ,, Druery.
,, ,, *setigerum percristatum*, Sheldon.
,, ,, *unco-glomeratum* (original).
,, ,, *velutinum.*
,, ,, *Victoriæ* (original).
Blechnum sp. concinnum, Druery.
,, ,, *cristatum*, Rowlands (Llanberis).
,, ,, *imbricatum*, F.W.S. (Brotherswater).
,, ,, *percristatum*, Rowlands (Pembrokeshire).
,, ,, *plumosum*, Forster.
,, ,, *serratum*, Airey (Smithies's type).
,, ,, ,, Henwood (original).
,, ,, ,, ,, (Sheldon's seedling).
,, ,, *trinervium coronans*, Barnes.

Cystopteris alpina (3 or 4 types).
,, *fragilis cristata.*
Dryopteris dilatata cristata-gracilis, Roberts.
,, ,, *grandiceps*, Kirby.
,, *alpina fastigiata*, Cowan.
,, *filix-mas lux-lunæ polydactyla*, Phillips.
,, *pseudo-mas apospora cristata*, Cropper.
,, ,, ,, *fimbriata-cristata angustata.*
,, ,, ,, *ramo-cristata*, Fitt.
,, ,, ,, *ramosissima*, Wright.
,, *propinqua linearis.*
,, *montana angustata*, Barnes.
,, ,, *cristata-gracilis*, Druery.
,, ,, *corymbifera*, Garnett.
,, ,, *congesta*, Whitwell.
,, ,, *filifera*, Wiper.
,, ,, *grandiceps*, Barnes.
,, ,, ,, Smithies.
,, ,, *plumosa*, Barnes.
,, ,, ,, F.W.S.
,, ,, *plumosa cristata*, Whitwell.
Polypodium vulgare acuto-serratum, O'Kelly.
,, ,, *aurito-dentatum pulchrum*, O'Kelly.
,, ,, *Cambricum Barrowii.*
,, ,, ,, *Hadwinii.*
,, ,, ,, *Prestonii.*
,, ,, ,, Whilharris.
,, ,, *Cornubiense* (*trichomanoides*).
,, ,, *grandiceps*, Forster.
,, ,, ,, Parker.
,, ,, *semilacerum*, "Jubilee," Lowe.
,, ,, ,, *undulatum.*
,, ,, *serra*, John Wilson.

Polystichum aculeatum pulcherrimum, Bevis (original).
,, ,, ,, Druery.
,, ,, ,, Cranfield.
,, ,, ,, *plumosum*, Green.
,, ,, *gracillimum*, Druery (2 forms).
,, ,, ,, F.W.S. (2 forms).
,, ,, *plumosum*, Edwards.
,, *angulare acutilobum percristatum*, Cranfield.
,, ,, *divisilobum grande*, Jones.
,, ,, ,, *plumosum* (several forms).
,, ,, *plumosum*, Patey.
,, ,, *plumoso-decompositum*, H.S.
,, ,, *plumosissimum*, Birkenhead.
,, ,, *perserratum*, Patey (original).
,, ,, *pulcherrimum*, Moly (Green).
,, ,, ,, *variegatum*, Moly.
Phyllitis scolopendrium crispum fimbriatum.
,, ,, ,, ,, *muricatum.*
,, ,, ,, Roundstone var.
,, ,, ,, *splendens*, Moly.
,, ,, *sagittato-crispum*, Wollaston.

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

F. W. STANSFIELD, M.D., F.L.S.,
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VOL. VI. No. 9.

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, F.L.S., "Monkhams," Lower Road, Great Bookham, Surrey.

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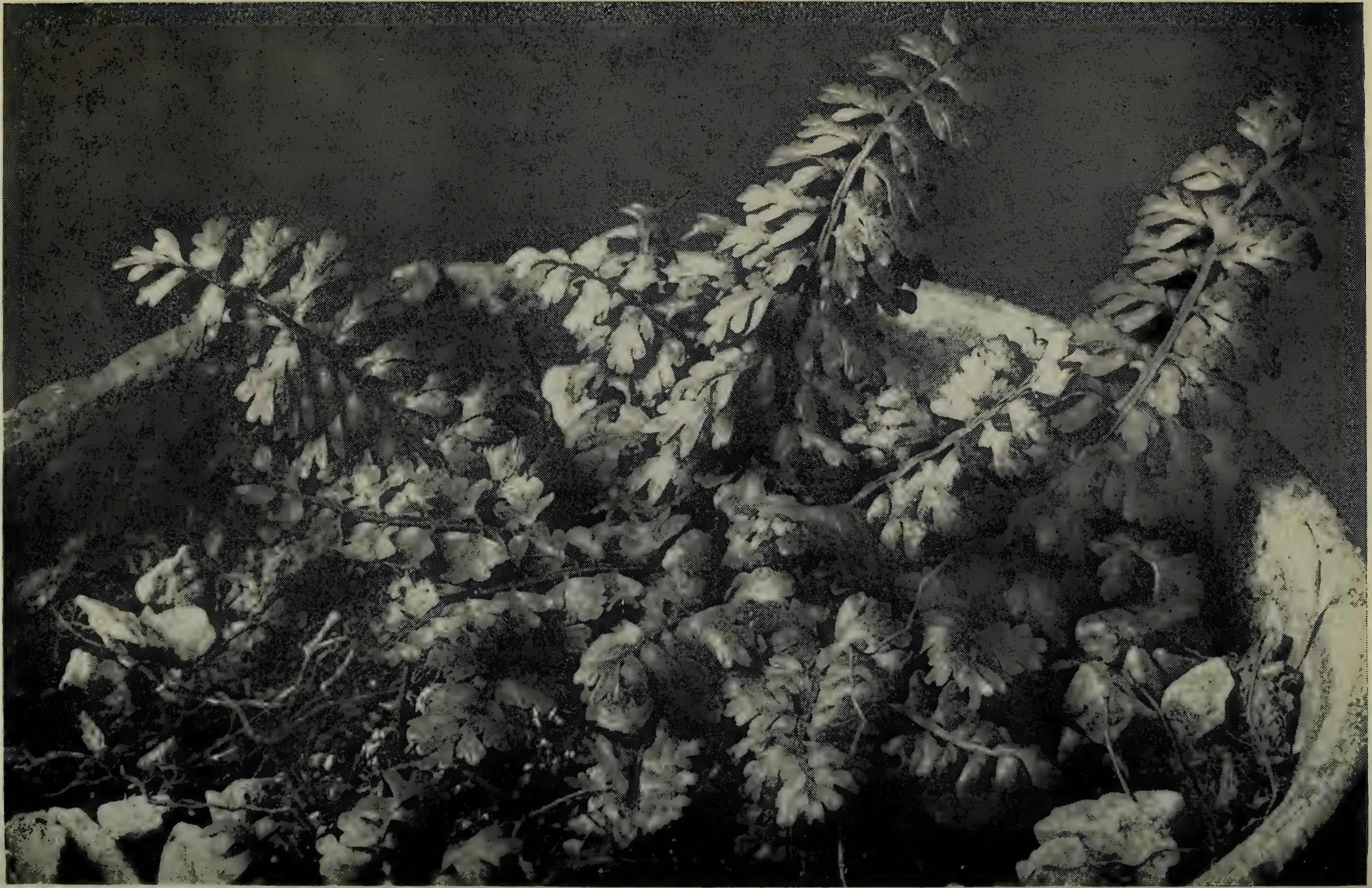

Asplenium viride plumosum, Greenfield.

THE

BRITISH FERN GAZETTE.

NEW SERIES.

VOL. VI. DECEMBER, 1933. No. 9

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EDITORIAL NOTES.

Mr. Robert Pease, of Lostwithiel, has sent us a photograph of his ramo-cristate *Blechnum* found in Cornwall in 1932 and previously noted on p. 164, Vol. VI of THE GAZETTE. It has developed into a fine specimen and is a well-marked and distinct variety, though resembling, in its general characters, the variety *ramo-cristatum* of Maunder, found in Wales many years ago. The crests of the new find are somewhat more lax in build than those of the older form and the lamina of the fronds folds back curiously at the points of the bifurcations.

Mr. B. H. Keall, of Chelmsford, sends us a photograph of a single transplanted prothallium of *Cystopteris fragilis* which has continued to grow and branch until it covers an area of six square inches without having produced any fronds. The explanation of this is probably the absence of either the male or female organs, although normal prothallia usually produce both. It may be, however, that the antheridia are unable to reach the archegonia. Ferns, like other organisms, breed much better in company with others of their kind than as isolated individuals. This prothallium is possibly a male or female anchorite.

Our Treasurer, Mr. Sheldon, has sent us a part of a frond from an *Athyrium* which his son, Dr. Colin Sheldon, has found this autumn in South Cornwall. It seems to be a promising form, having finely dissected fronds, and bearing rather large terminal crests, the ultimate divisions of which are also finely divided. We hope to see the plant next summer and to be able to report more fully upon its capabilities.

OUR FRONTISPIECE.

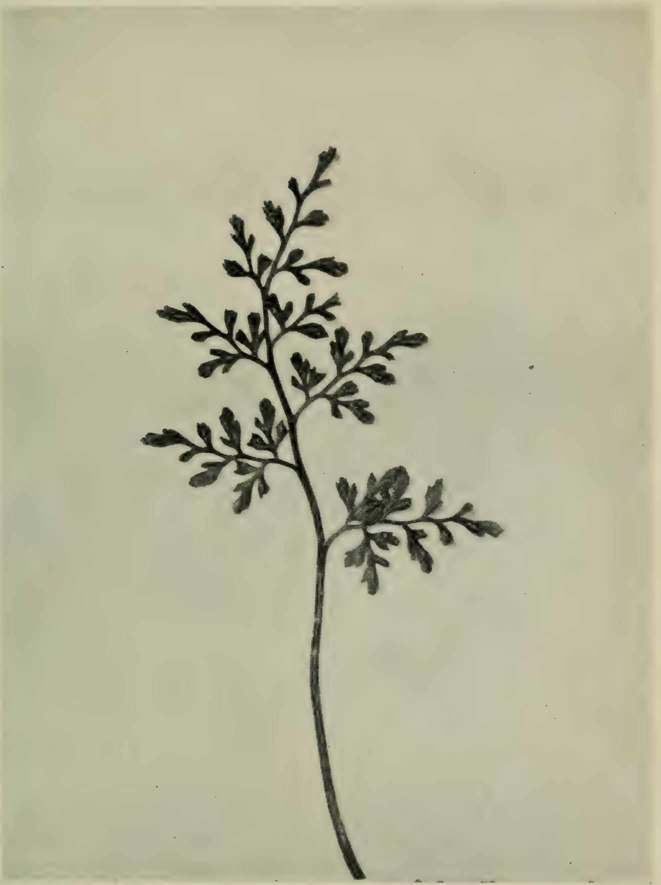
Asplenium viride plumosum, Greenfield.

As this fern was described, and its history given, at p. 129 in the present volume of THE GAZETTE, it is unnecessary to go over the ground again. The photograph speaks for itself. The plant is now well established, though still rather a small scrap ; the photograph has been enlarged to double size so as to show the character better. The plant, however, must be seen alive to be properly appreciated.

ASPLENIUM RUTA-MURARIA DECOMPOSITUM, BLOW.

(*Fern as shown in photograph.*)

In the autumn of 1931 a fellow member, Mr. James A. Sinclair, and I were on a mainly photographic journey through the centre of France and on to the South to see the Route des Alpes—Nice to Geneva—one of the most beautiful pieces of scenery throughout the whole of its length. Of course, ferns were looked for. At Annecy, where a long halt



Asplenium Ruta-muraria decompositum, Blow.

was made and the lake explored by boat, at one of its old-world villages, Taillores, the ruined walls were covered with *Aspleniums,* especially *Asplenium Ruta-muraria.* Interspersed with the plant in its usual form were many noteworthy patches of a specially large form, as shown in the illustration, and about which the Editor would doubtless give us his opinion. The photograph is from a plant brought home and grown for a year.

The stay in Annecy was a particularly memorable one, for about a week previously England had gone off the gold standard. At Nice we were surprised to have some little difficulty in getting exchange at Messrs. Barclays branch, but imagined that all would be well in a few days. However, in view of the reports in the papers, Mr. Sinclair decided to return to London. We went to the station and booked a seat for the next day's train. The very polite lady booking clerk said she ought not to book the seat without our taking a ticket also, but we said we had not enough money in our pockets to pay for the ticket at once, but would call the next morning after we had visited the bank. We little knew what awaited us. The next morning we produced our letters of credit and the banks would not advance money on these. Then we produced £5 notes, £1 notes and eventually gold, but all were refused. We counted our available cash and managed to pay our hotel bill by the landlord accepting a £1 note in addition to most of our French money. This left us with sufficient to get a light lunch ; to send a telegram to a friend in Geneva asking him to meet a train at the station with 500 French francs in order to get Mr. Sinclair to London ; and then with the balance to purchase two 3rd class tickets to Geneva, where we arrived with the equivalent of 10d. between us—a very narrow shave.

Our good friend duly met us, and took us at once to the P.L.M. railway office and bought Mr. Sinclair's ticket. This was at 5 p.m. and the train not going until 10 p.m. we went home to dinner with our friend, who has one of Voltaire's old chateaux—that of Tournay—and after Mr. Sinclair had been seen off by train, I stayed on at Tournay for a further week. This ended a rather remarkable episode which affected many others who had no friends to help them and were completely stranded.

THOMAS BATES BLOW.

[The photograph as sent by Mr. Blow, although admirably clear, does not show adequately the character of the variety on account of most of the fronds being seen edge-ways instead of full face. We have therefore substituted another photograph which, although only a single frond printed life size, shows the decompound character much more fully and almost suggests another species. It is, however, undoubtedly *Ruta-muraria* as proved by the fact that a plant, sent to the Editor in a dried up condition, at first produced only normal fronds, but afterwards, upon becoming established, developed the divided fronds as shown in the photograph. It is certainly the most distinct form yet found of this species.—*Ed.*]

THE ANNUAL MEETING, 1933.

The Thirty-eighth Annual Meeting of the Society was held on Monday, July 3rd, 1933, at the Angel Hotel, Helston, Cornwall, the President, Mr. W. B. Cranfield, F.L.S., F.R.H.S., occupying the Chair. Other members present were:—Mr. T. E. Henwood and Mr. T. B. Blow, F.L.S. (Vice-Presidents), Mr. Jas. A. Sinclair, Mr. F. W. Thorrington, Mr. Percy Greenfield and Dr. F. W. Stansfield (Hon. Secretary).

The Minutes of last year's Annual Meeting were read, confirmed, and signed by the President.

The President welcomed the members and gave a brief resumé of the affairs of the Society, showing that the British Pteridological Society was in a better position, both in finance and in membership, than many other societies, both having been practically maintained during the year.

Letters regretting inability to be present were read from Mr. Alex. Cowan and Mr. G. E. Stephens (Vice-Presidents), and from Mr. J. J. Sheldon (Treasurer), who was unfortunately prevented, by an attack of rheumatism, from travelling. Also a letter from Mr. J. C. Williams, Lord Lieutenant of Cornwall, inviting the members to lunch at Caerhays Castle and to see his gardens and woods.

Mr. Cowan reported that his crested *Lastrea propinqua*, found last year, had only as yet imperfectly recovered from the injuries it received when collected. Also that his *Scolopendriums* all seemed to be dying from an attack of a fungus which was known to prey upon this species.

The President read a letter which he had received from the Rev. Canon H. Kingsmill Moore, Vice-President, regretting his inability to be present and submitting a suggested resolution to the effect that an honorarium should be awarded to the Editor of THE GAZETTE each year when the funds of the Society would permit, the amount to be governed by the state of the Society's funds each year. The President proposed and Mr. Thorrington seconded that the President, Mr. Blow, Mr. Henwood, Mr. Greenfield and Mr. Sinclair should be a Sub-Committee to consider and report upon what steps should be taken to recognise the services of the Editor and Secretary.

Dr. Stansfield disclaimed any desire for an honorarium, but said that as a member of the Society he thought the time had come for the Society to seek a younger and more energetic Editor. He was himself conscious that he was now mentally less alert than formerly.

The resolution was carried.

The Hon. Secretary read his report as follows :—

" Mr. President, Ladies and Gentlemen,

Again I have to report that there has been no increase in the membership of the Society during the year. Four valuable members have died, including Mr. J. H. Bowman, of Newbury, whose death was recorded in the GAZETTE of December, 1932. Other recent losses are Mr. Thomas Brown, J.P., of Belfast, and Mr. Robert Sutcliffe, of Burnley, Lancs. Both were real fern-lovers. Mr. Brown attended our meetings as often as convenience permitted and took a strong interest in ferns and in the GAZETTE. Mr. Sutcliffe frequently corresponded with the Secretary on fern subjects and was a cultivator of ferns as well as a regular reader of the GAZETTE. Mr. Spencer H. Bickham, J.P., F.L.S., whose obituary notice was published in the GAZETTE recently issued, though not a fern specialist, was an enthusiastic general botanist and a friend of all good plant-lovers. Five members have resigned during the year, including Dr. R. Ll. Praeger, of Dublin, and Mr. W. Gordon, of Dumfries. Both are old members and have done good work in their time and we regret their loss as well as that of the three other members who have withdrawn from our small band. Two members have been lost sight of through change of address. The number of subscribing members is now 113 and there are eight honorary members. No new member has joined the Society since the last Annual Meeting. A number of complimentary and exchange copies of the GAZETTE are regularly issued, including those sent to :—

The British Museum,
The Linnean Society,
The American Fern Journal,
The Smithsonian Institution (U.S.A.),
The Royal Botanic Society of Belgium,
Biological Abstracts (U.S.A.),
and others.

Copies are also sent from time to time to persons who are indicated as possible recruits.

So far as is known but little fern-hunting has been done during the year and that little was recorded in the December GAZETTE. The crested form of *D. filix-mas* found in N. Wales after the last Annual Meeting was not removed, but spores were gathered and were sown in December last. Young plants are now appearing from this sowing, which suggests that this fern may be apogamous like *paleacea cristata* and *paleacea polydactyla*. Young plants of the sporophyte generation are also appearing in a sowing of M. Kestner's hardy type of *Asplenium lanceolatum* made in April, 1932. Should these prove to be really hardy in our climate this will be a distinct gain as the British type of the species is difficult to keep through the winter in most parts of England and Scotland without artificial heat. The spores sent by M. Kestner of a possibly hardy form of *Adiantum capillus-Veneris* and sown in December last, have failed to germinate. A batch of seedlings raised from the *setoso-decompositum* form of *P. angulare*, found near Sherborne in 1928, turned out a very promising lot and seem at present to be an advance upon the character of the parent. Many of them look more like *perserratums* than anything else and nearly all seem to be more setose than the parent."

The Treasurer's report, in the absence of Mr. Sheldon, was read by the Hon. Secretary as follows :—

BALANCE SHEET.

Income.	£	s.	d.	Expenditure.	£	s.	d.
Balance from last year	69	4	11	Affiliation Fee, R.H.S.	2	2	0
Subscriptions paid ...	34	3	6	GAZETTE, Dec., 1932	19	19	1
Sale of GAZETTES ...		16	0	,, June, 1933	13	8	2
Advertisement ...	2	2	0	Postages and Sundries	2	16	7
				Balance at Bank ...	68	0	7
	£106	6	5		£106	6	5

Audited and found correct, June 28th, 1933.

(Signed) PERCY GREENFIELD,
Auditor.

It was proposed by Mr. Henwood, seconded by Mr. Thorrington, and resolved :—" That the Hon. Secretary's and Hon. Treasurer's reports be approved and adopted."

ELECTION OF OFFICERS.

Dr. F. W. Stansfield proposed and Mr. Henwood seconded:— " That Mr. W. B. Cranfield, F.L.S., be re-elected President for the coming year." Carried unanimously.

A letter having been read from Mr. G. E. Stephens again expressing his desire to retire from the Vice-Presidency, Dr. Stansfield proposed and Mr. Sinclair seconded :—" That the remaining Vice-Presidents be re-elected."

The President proposed and Mr. T. B. Blow seconded :—"That Professor F. E. Weiss, F.R.S., P.L.S., and Mr. F. J. Hanbury, F.L.S., be elected Vice-Presidents if, after consultation, they should be willing to accept the nominations."

Both resolutions were carried *nem. con.*

Mr. Blow proposed and Mr. Sinclair seconded :—"That the remairing officers be re-elected *en bloc.*" Carried unanimously.

Dr. Stansfield proposed and Mr. Henwood seconded :—"That the old Committee be re-elected, with the exception of Mr. Thomas Brown, deceased, and that Mr. G. E. Stephens be elected to fill the vacancy caused by his death." Carried unanimously.

EXHIBITION OF FRONDS, ETC.

Mr. Greenfield exhibited, on behalf of Mr. Sheldon, a frond of a very fine *Polystichum* which Mr. Sheldon had found a year or two ago in this district (near St. Anthony). It was on the border-line between *aculeatum* and *angulare*, and was named *P. aculeatum folioso-incisum*, Sheldon. Mr. Sheldon was awarded the Society's Certificate of Merit for this variety on the proposition of Mr. Blow, seconded by Mr. Henwood.

The Rev. Canon Kingsmill Moore, D.D., sent a fine series of fronds of *Polystichums*, all very well grown and in fine condition, including a *P. ang. tripinnatum* of his own (*tripinnatum grande*, K.M.). Also *P. ang. plumosum*, Elworthy, *P. a. plumosum grande*, Moly, and others.

PLACE OF MEETING FOR 1934.

The President proposed and Mr. Blow seconded :—"That the place and time of meeting should be left for decision to the General Committee, a preference being expressed for the S.W. of England or some part of Wales." Carried *nem. con.*

Most of the party remained in the neighbourhood for a week or so during which many of the most promising places in S. Cornwall were visited and explored, including Porthleven, Lizard Point, Kynance Cove, Manaccan, St. Anthony, St.

Keverne, Mawgan and Gweek. Ferns were exceedingly abundant in suitable localities and were very finely developed. The species seen were *Asplenium marinum*, rather sparingly on rocks near the sea, *A. lanceolatum* (only one plant), *A. Adiantum-nigrum*, plentiful, *Athyrium filix-fœmina*, *Blechnum spicant*, often two feet in height, *Lastrea æmula*, very beautiful and finely developed, some plants having fronds over two feet in length, *Lastrea dilatata*, *L. filix-mas* and *L. paleacea*, *L. spinulosa*, *Osmunda regalis*, *Polystichum angulare*, *Polypodium vulgare* (sparse and rather poor), and *Phyllitis Scolopendrium*. These species were mixed together in the most confusing way, the limestone species (*angulare*, *P. vulgare* and *Scolopendrium*) being mixed with *Blechnum*, *L. dilatata*, etc. The real lime-lovers were, however, evidently not in their element and did not show the same development as the non-calcareous species. Varieties were neither numerous nor important, but a few minor variations were seen, such as a crested *Scolopendrium*, an acutilobe, a *foliosum* and an *alatum* in *angulare*, a caudate *Blechnum* and an interrupted *Osmunda*. None of these, however, could be considered a great prize and the fern population of the county was left practically intact. Some interesting flowering plants were seen, including *Erica vagans* and its white variety, *Herniaria ciliaris*, *Scilla verna* (out of flower), *Fumaria occidentalis* (doubtful), *Silene maritima* and *Plantago maritima*.

Lastrea æmula, as seen growing here, was a revelation to many of us. When growing at home, as it was here, it is one of our most beautiful native species, rivalling the plumose *Athyriums* in grace of habit and cutting and with a striking deep grass-green colour. It was found growing at its best in deep beds of leaf-mould, thus affording a useful hint for its cultivation. No doubt it could be raised from spores as readily as other species though probably it has not often been propagated in this way under cultivation. We mention this to indicate that it would not be necessary to spoil the country-side in order to obtain stock of this rather uncommon species.

HARDY FERNS AT SOUTHPORT SHOW.

Ferns were exhibited in fine form at Southport this summer although the effects of the hot and dry summer were apparent in many of the exhibits. Messrs. Bolton & Son, although living in one of the driest counties in England, were able to put up an exhibit, in the class of "groups arranged for effect," which obtained a well-deserved first prize and the silver challenge cup. In 1932, Messrs. Bolton won, by a short head, mainly on the quality of their ferns, but this year they were well ahead on all three points of quality, condition and arrangement, their ferns being all good things, in faultless condition, and admirably arranged for effect. The three remaining groups were more nearly on a level, but were all remarkably creditable in view of the trying character of the season. Mr. Lloyd, of Southport, who set the pace last year in the matter of arrangement, was this year not quite so effective and, although he had an admirable group of ferns, came second. Mr. Albert Prince, of Tarporley, was third and Mr. Lovelady, whose ferns (although good and well grown) showed the effect of the torrid summer, was fourth. In the class for twelve hardy British ferns, Messrs. Bolton again led, Mr. Askew being second and Mr. Lovelady third. In the class for six British ferns Messrs. Bolton also obtained first place, Mr. Lloyd being second and Mr. Lovelady third. For three *Polypodiums* the winners were: 1st, Mr. Askew; 2nd, Mr. Lovelady; and 3rd, Mr. Lloyd. The best *single* plant in this series was, we think, Mr. Lovelady's plant of *Polypodium v. Cornubiense*, in perfect character and condition —such a plant as is rarely seen of this lovely but slightly erratic variety. Mr. Lovelady was first with three *Polystichums*, Mr. Lloyd being second and Messrs. Bolton third, while Mr. Lloyd took first place with three *Athyriums*, followed by Mr. Askew and Mr. Lovelady. In Class 17 (six British ferns in not fewer than three distinct varieties) Mr. Luckin, of East Grinstead, was the winner, Mr. Lloyd being second and Mr. H. S. Baucher third. In Class 18 (three British ferns dissimilar) Mr. Lloyd was first, Mr. Ernest

White being second and Mr. R. H. Monkhouse third. In Class 16 (one British fern of a variety raised in the garden or on the premises of the exhibitor) Mr. Lovelady took first prize with a beautiful plant of an improved type of *P. aculeatum pulcherrimum.* We understand this plant was raised by apospory from the projecting tips of the parent fern, the late Mr. Smithies, we believe, being the only other person who has raised plants from the aposporous tips of this variety. On the whole the honours were fairly well distributed among the exhibitors, though it must be confessed that Messrs. Bolton took the lion's share.

The labelling of the exhibits left much to be desired, many of the ferns bearing no names at all, while some were wrongly named and, in one case, a fine plant of the culinary asparagus was shown as a fern though, needless to say, it did not obtain a prize. In the case of groups arranged for effect there is, no doubt, some excuse for the absence of labels as these may be considered to detract from the natural appearance of the group, but in the more formal classes of twelve, six and three, there is really no excuse for the omission and it certainly detracts seriously from the value of the exhibition so far as the visiting public is concerned. Even in the groups for effect we think the more important plants should have labels, though these need not be obtrusive or over-conspicuous.

F.W.S.

FERNS AT SOUTHPORT SHOW

(from the point of view of a visitor).

A critic has been defined as " a man who has failed," and in that case there are many of us lesser fern-growers who are qualified to comment on the fern exhibits at Southport, since we have never produced anything to equal what was shown : and so here are a few notes from one who has failed, but, even when most critical, is not indulging in a feeling of " sour grapes," the more so as he was not an exhibitor.

To start with comparatively lesser matters, a rule should be made that all ferns shown, except in the big group class, must be named ; this was referred to in the 1932 (June) notes and perhaps is better attended to than it was, but the penalty of disqualification would not be too severe in cases of neglect : then there would not be mistakes such as one enthusiastic lady was heard to make as she saw an un-named potted corymbose congested *Athyrium*, " look, here's a parsley fern " : this is what it resembled—parsley—but she will not recognize the real thing when she sees it growing wild ; and it might also be made more clear to visitors that most plants on view are varieties, not species : and, although it did not occur in the hardy fern section, something drastic should be done to an exhibitor who puts in a clump of garden asparagus, with berries on it, a performance remarked on in the 1932 GAZETTE, though this time it did not secure a prize but only the too kindly comment, " This is not a fern."

Other uncertain points, also previously referred to and therefore better not repeated here, were noticed. So, to turn to the exhibits themselves, one criticism which will be challenged may be put first : that is, the undue proportion of *Athyrium* and *Scolopendrium* varieties ; there were separate classes for both these, but in four other classes, even in that for one hardy British fern only, as well as in the big staged collections, varieties of these two ferns were far too freely used, especially as the dry season had proved almost too much for many *Athyriums* : and further, these latter (not *Scolopendrium*, which as a species runs to the gigantic) were much too big and lanky—all honour to the owners for the care bestowed upon such favourite plants and for the skill shown in packing and bringing them, nevertheless.

It would be merely wearisome to everyone to go through every class even without detail, but one may be allowed remarks on some sections. Beginning with that for three *Polypodies*, in which there were (in our opinion) the best plants and some of the most attractive in the Show, and it is an opinion that was apparently shared by one of the judges, our Secretary. And then turning to the class for six in three varieties, in which too few *species* were represented by varietal forms, this also applies to the previous class, ferns raised by the exhibitor, in which there were two *Scolopendriums* and a *Polystichum* winning the three prizes.

Only in the case of the *Athyriums*, already referred to, does one wish to comment adversely on the condition of the actual plants, nearly all of which were very fine and, it is to be hoped, impressive to those who saw for the first (and even second or third) time what a variety can be in the hands of painstaking owners. The climax once again was reached on arriving at the stages, which left the failure speechless for a time.

If he may now venture on one, his last, remark, on this section, it is simply to say that even in the midst of all that magnificence wonderfully arranged, the finest thing was a bit—apparently—of tucked-in padding in the shape of *A. f.f. unco-glomeratum*. The glowing freshness of this beautiful thing was astonishing and remains the most distinct memory of our visit.

Is this too carping ? We hope not. It is not a description of the ferns, with which the entire GAZETTE could easily be filled, but which should never be attempted ; for only personal inspection of the still flourishing cult can ever give real satisfaction.

E. A. ELLIOT.

INFLUENCE OF ENVIRONMENT ON VARIETAL CHARACTER IN FERNS.

The influence of environment on variation has often been discussed and it has been thought, at times, that changed surroundings might cause actual change of character in ferns and in other living organisms in the same way that the moral and mental character of a child is modified by its education. The two cases are, however, not quite parallel, though they are perhaps nearer akin than some may imagine. In the first place, the mental character of a human being or a dog or a horse is not a fixed thing from birth, but something which is continually developing, in one way or another, from birth until death. Each individual is born with a number of tendencies, inherited from a long line of ancestors, of very varied and often conflicting character. Some of these are developed and others discouraged by education and by the example of those around it. A child, which is early taught to lie and to steal and to look after No. 1 generally with a disregard for the feelings and right of others, is pretty certain to develop into a bad character since any innate moral tendencies are stifled and atrophied by the evil surroundings, while the *same child*, if educated on good and favourable lines, may be enabled to choke off the selfish and dishonest impulses and to develop into a valuable citizen. Since the innate good and bad impulses are very unequally distributed there is no reason why children, brought up under apparently identical conditions, should all turn out alike. What is good for one may be bad for another and so, to paraphrase slightly the words of the poet, while "some are born good, some achieve goodness and some have goodness thrust upon them."

What has all this to do with ferns? Can we "bring up" ferns to be plumose or crested or divisilobe or otherwise virtuous? No! All these things are inherent in, or absent from, them from the first fertilized germ cell. Some of the characters, however, are more stable than others and can be encouraged or discouraged by treatment. Quite a number of *pulcherrimums* in *Polystichum angulare* have been found wild but most of them have now disappeared *as pulcherrimums* though the individuals, in some cases, remain as normals. Moly's green *pulcherrimum* still remains but with conflicting tendencies and most of the plants produce only a proportion of characteristic fronds while the rest are normal. This unstable character was present from the first, but at one time I was able to select a crown which produced all "true" fronds and this was known as "the corrected plant." The unstable form was discarded and the corrected plant was supposed to be permanently a true *pulcherrimum*. It continued true to type for a good many years, but seemed to have slightly less vigour than the dimorphic plant, and, being left alone for a few years, it probably exhausted the soil around it to some extent : then came a wet winter followed by a dry and cold spring, and the new fronds came up feebly and many of them failed altogether ; presently came a number of *normal* fronds and the plant regained vigour, but, with it, its original dimorphic character. I hope, in time, to be able to re-select another corrected plant, but "time is the stuff that life is made of" and there may not be enough of it available for me. However, I trust that, in that, or indeed in any, case, others will carry on the good work. The corrected plant was a "bud sport." A not quite similar case is that of *P. angulare flabellipinnulum*, a beautiful thing found by the late Dr. J. S. Wills in 1878. It has been in cultivation ever since, but a proportion of the plants have, all along, shown a tendency to degenerate into a rather poor type of *acutilobum*. These have mostly been discarded as they appeared (all of them by me) and the true type has been preserved. I have now one plant which has remained perfectly true to type for the forty years I have had it, and it seems to be quite stable in character as do the plants raised from its bulbils. This variety was not originally dimorphic, but individual plants from time to time would send up a degenerate frond and this aberration of character was invariably, in my experience, the prelude to the whole plant going to the bad or "going native" as Mr. McIntosh would say. I should like to raise seedlings from this virtuous plant, but this year, for some reason, it has not produced a single sorus or sporangium although the plant is in robust health. It is hoped that it may, in future years, again produce spores as it has done in the past and give rise to a generation impervious to the temptation to "go wrong." Another case of a more or less reformed character is *Polypodium v. Cornubiense* which, when first found, produced a large majority of finely dissected fronds with a few of a normal, or partly normal, character. In course of time the dissected fronds began to be, in many cases, less finely cut and the plant became more vigorous, but lost much of its beautiful parsley-like character. Messrs. Backhouse, however, by persistent selection, found a rhizome which continued to produce the finely dissected fronds and this became known as the variety *trichomanoides*, which is still in cultivation and remains true to the original character, though it has never ceased to produce a few normal fronds. Again there are, or have been, a score or more of different forms of the *crispum* type of *Scolopendrium*, all distinct and recognizable by an expert when grown under favourable conditions. When grown under merely average or inferior conditions, however, they tend to become very much alike and are difficult to distinguish one from another. They still remain *crispums*, but tend to lose the finer characters which distinguish the subvarieties. This is why a neglected collection of ferns, or one grown under somewhat unfavourable conditions, fails to impress the onlooker. Here comes in the value of the specialist and the exhibitor who " does his things well " and shows what they can do under fair and generous treatment. In 1914 I found, in Eskdale, Cumberland, a *Lastrea montana* growing in *Sphagnum* and of a pure golden colour like the " Golden Feather " *Pyrethrum*. It was taken home, on the offchance of its being permanent, and planted in soil suitable for *montanas*. Next year it came up perfectly normal. This was, of course, a case of anæmia or disease induced by lack of suitable nourishment. In 1931, while hunting near Whitewell, Yorks, along with the Rev. E. A. Elliot, I found another *montana* growing in a *Sphagnum* swamp and under even wetter conditions than the Eskdale one. This was of the normal colour, but was plumose or sub-plumose in character and was collected as a possible prize, but not without some doubts. In 1932 it was very foliose and fairly vigorous, but less deeply incised than when found. This year, with a very dry growing season, only a few fronds are moderately incised, the rest being merely slightly serrate or approaching the normal. This seems to be a case of a real variation, though a comparatively slight one, which was apparently enhanced, for the time being, by the wet conditions and by the fact that, when found, the plant, though of full normal size, was quite barren of sori. Last year it produced spores, some of which were sown, and young plants have now been pricked off. It remains to be seen whether there will be any variation among them. I am hopeful that there may be and that one, or more, may go a step beyond the parent. If that should be so it will be a case of an incipient variation which would not have been noticed but for its temporary enhancement by the abnormal conditions in which it grew. Another case is that of *Lastrea filix-mas cristata*, Burton. When first found this was somewhat on the lines of Martindale's *cristata*, having the same upward curving prinnæ and slender habit, the crests, however, being more finely divided and refined looking. There was, however, an ominous touch of the " roguishness " which is so often found in varieties of this species, but it was hoped that this might disappear with liberal cultivation and, actually, at first it produced, under cultivation, a large proportion of beautiful and perfect fronds with a suggestion of *percristatum* about the pinnules. In my hands, however, it gradually produced more and more fronds of the depauperate and irregular character and was eventually looked upon as an " incorrigible rogue." Last year, however, a self-sown seedling from it appeared and this has this year sent up a large proportion of fronds of perfect and unspoilt type ; and, although a few fronds show traces of " original sin," hope is entertained that, even if the original should prove incorrigible, it may produce offspring of untainted and permanently regular character. The moral of this article is : if you have good or promising ferns, treat them well and they will be less likely to disappoint you than if they are neglected or maltreated.

F.W.S.

HOW LONG DO FERNS LIVE ?

It is certain that many of our species are long-lived—a comforting thought for those who value their collections ; but from the nature of the case not much evidence is available as to the life tenure of individual specimens.

This short note is written as a limited contribution to the subject, in the hope of eliciting further information from the lore of our Editor and the experiences of others.

About 1880 the Rev. H. Davy found, in the Dargle, Co. Wicklow, a *Polystichum* which was then full grown. In October, 1900, I noticed the fern in Mr. Davy's collection and expressed the belief that it was new. It seemed to stand, as it were, between *P. aculeatum* and *P. angulare*. But what chiefly attracted me was the sinuous stem. Mr. Davy gave me the plant. I submitted a frond to Mr. Druery, who agreed that it was new and accepted my suggested name, *P. ang. sinuosum*. Since 1900 the plant has flourished with singular constancy in the same place. It has remained almost identical in size, sending up eight or nine fronds each year. No tendency to a division has appeared ; but always there is an abundant crop of spores. How old the fern was when found it is impossible to say, but it can be estimated at sixty years now, and it may be much older.

As my own collection began in the 'Nineties, I have specimens of *Athyriums*, *Lastreas*, *Polystichums* and *Scolopendriums* which are certainly forty years old. I have also *Polypodium vulgare* whose stock is from the same date. Owing however, to the different habit of growth, I am not sure that my present *Polypodiums* come from the original rhizomes. Our Editor can help us as to this doubt.

From these few facts it would seem that if nothing unforeseen, such as disease or accident, occurs, the ordinary life of our native ferns and their varieties is over fifty years.

H. KINGSMILL MOORE.

[We have a plant of the original *Athyrium f.f. plumosum*, Horsfall, found in 1860 which continues to flourish with apparently undiminished vigour, while the original *A. f.f. Victoriæ* found in 1861, though still fairly healthy, is decidedly less vigorous than plants of the same variety which have been raised, more recently, from spores. Another case of long life is the original *P. ang-plumosum*, Elworthy, found in 1856. Canon Moore sent a frond of this to the annual meeting this year, which was, we think, finer than we have ever seen this variety before.—*Ed.*]

A SIMPLE METHOD OF RAISING FERNS FROM SPORES.

The method to be described here falls short in scientific exactitude of the method used by our President and Hon. Secretary. Their more perfect processes have been described in the Gazette ; the only reason for publishing my plan is that it has met with success ; and its simplicity may enlist new recruits in the fascinating hobby of raising rare specimens, and seeing new forms develop.

The necessary " plant " is in everybody's reach :—

(1) A well-made wooden box, whose joints fit closely, and whose timber inside and outside is smooth as a table-top. Such a box excludes such vermin as woodlice and makes it difficult for foreign spores to intrude. The boxes I use are what are known here as " butter boxes." They are 12 inches deep inside, and 10¾ inches square at bottom. The sides slope outwards, making the opening at the top 11¾ inches square. The slope is convenient, but not essential for spore-growing. Holes for drainage must be bored in the bottom.

(2) A sheet of glass of size sufficient to cover *closely* the top of the box.

(3) Well washed and scalded 3-inch pots, with one scalded crock at the bottom of each. Nine fit into the bottom of a " butter-box."

(4) Cocoanut fibre, or any similar substance, into which the pots, when ready, are plunged up to the brim.

(5) Small pieces of glass to cover closely the pots.

(6) Compost. I have tried various composts with equally good results. Sandy loam, or fine leaf-mould, seem best ; but if the compost is passed through a very fine sieve, and so reduced to powder, its constituent parts will be unimportant.

When about to sow I bring my " plant " close to the kitchen door and arrange for a plentiful supply of boiling kettles. The cocoa fibre is spread on an old tray and thoroughly scalded ; the boxes scalded inside and outside ;

the fibre is quickly spread over the bottom of the box ; the glass for the top is wiped, on both sides, with the hottest cloth it is likely to bear without cracking ; the box is covered with the glass.

Next the pots are scalded ; then the compost is filled in and gently pressed, till the surface is within three-quarters of an inch of the top. Then comes the scalding of the compost, a most important part of the work. The boiling water must go well through the pot ; it is advisable to go over all the pots a second, or even a third, time, in order to destroy any germs the compost holds.

The sterilising completed, thrust the pots into the fibre at the bottom of the box, and cover each with its piece of glass, remembering to wipe each glass with a boiling cloth. If you have plenty of the small glass covers, and can afford the breakage of a few, a better plan will be to pour boiling water over them. After the first pour turn the glass, that each side may be scalded.

In placing the box in the shadiest position in your greenhouse put something (tiles or sticks) to raise it enough from the stage to ensure drainage and prevent rotting.

When the compost, and the fibre, in which the pots are plunged is quite cool, all is ready for the sowing. To induce the spore-bearing fronds to deposit their dust-like spores my former plan was to lay the fronds on clean sheets of glass along with wooden labels. Now I place them in envelopes in a sunny window. They seem to deposit more readily in the envelopes, the labels lie inside, and it is much easier to scatter the spores evenly from an envelope.

The actual sowing may be done in all the pots at the same time or at intervals, according as the spores are ready. I lift the pots in turn, remove the glass cover, scatter the spores thinly, and replace, taking care to leave the pot without its glass as short a time as possible. The label is then pushed down beside the pot, and neither glass nor pot should be stirred until a green sheet, or green specks are seen through the glass. Watering is done down the sides of the box, and over the glasses. The glasses must be so arranged that the water can flow from them into every part of the fibre. There must be no watering of the compost, but the fibre must be always moist.

In most cases it is six months before any signs of growth appear. Not till after a year, or a year and a half, will the fernlets be ready for pricking out. So soon as tiny plants appear the glasses may be removed. Later the sheet covering the top of the box may be gradually shoved aside.

The essentials for success are thorough sterilisation, close covering, and continuous moisture.

Of 18 sowings made in 1931 and 1932, as described above, 16 have done well.

H. KINGSMILL MOORE.

[We would suggest that, in sterilizing the cover-glasses for the pots, instead of pouring boiling water over them one at a time, the lot should be placed in a saucepan of *cold* water and this gradually brought to the boil and kept boiling for five or ten minutes. The water can then be allowed to cool and the glasses removed seriatim as required. Thorough sterilization is ensured and there is a great saving of time and trouble.—*Ed.*]

ANOTHER FERN PEST.

For several years traces have been found of a kind of vermin which attacks the fronds of *Athyrium filix-foemina.* The first thing noticed is that some of the young and rising fronds wilt, suddenly and mysteriously, and eventually wither, while the rest remain fresh and green. On cutting off the damaged fronds there is found, in the central part of the rachis, a minute grub, semi-translucent and of a whitish or pale violet colour (the latter usually in the red-stemmed form of the fern), which gradually bores its way through the core of the stem and eventually emerges near the base, having completely destroyed the frond. This year some of the fronds, containing the grubs, were submitted to the laboratory of plant pathology attached to the Ministry of Agriculture. The grub was promptly recognized as the larva of a saw-fly, but the species could not be identified until the insect had been allowed to complete the cycle of existence and to produce the perfect fly. This was then identified as *Heptamelus ochroleucus*, Halliday, which, it is said, has not often been recorded in Britain. It was known that the larvæ burrow in the leaf-stalks of *Athyrium filix-foemina*, but it had not been known to attack any other species. In our garden this year we found a *Blechnum* of robust habit which had been attacked by this or some similar insect, but apparently the plant had been found distasteful for the grub had either perished or migrated after boring an inch or two into a large frond. Our neighbour, Mr. A. J. MacSelf, found traces of the same kind of thing in the upper part of the fronds of some of his plants of *Polypodium vulgare*, but the attack had been even less successful than in the *Blechnum*, although quite a number of fronds had been entered. It seems, therefore, that the insect looks upon the lady fern as its normal food. It is not known whether this saw-fly has more than one generation a year, but it seems likely that there is only one—in the spring when the fronds are first rising. The larvæ seem to leave the leaf-stalks before pupating and probably either burrow in the ground or take shelter in the interstices of the crown of the fern. This year the pest seems to have been more than usually prevalent as several of our large specimen *Athyriums* have been attacked, the greatest damage being done to a large plant of *A. f.f. Clarissima*, whose symmetry and beauty were completely spoilt for the season. All the affected fronds were cut off and destroyed as soon as the damage was noticed, and a sharp look-out will be kept, in future seasons, for the first indication of wilting in fronds of *Athyrium*.

F.W.S.

THE DISTRIBUTION OF SPORES.

I was much interested in the observations, on the distribution of spores, which appeared in the last issue of the British Fern Gazette. Fern spores are so small as to be almost invisible to the naked eye, and are easily carried long distances by high winds—even from over the sea as you observe in regard to the habitat of *Adiantum capillus-Veneris* in Morecambe Bay, which is the most northerly station in Europe for this interesting fern. Some time after my discovery of this plant in its present position I happened to be spending a short time in the district when I noticed, growing out of the roof of an old greenhouse in a broken-down condition, a fine plant of *A. capillus-Veneris* which had established itself under the water spout of the greenhouse. This was interesting to me : the old greenhouse is situated some two miles from the habitat of the little colony of Maidenhair fern. The *Adiantum* family is a very extensive one, but chiefly confined, in its geographical distribution, to tropical countries. In the hand list of ferns and fern allies cultivated in the Royal Botanical Gardens at Kew, it is interesting to find such a large number of names ; over 150 species and varieties are enumerated. At the same time it is interesting to find, out of this extensive genus, that only one species is found in the whole of Europe. Its habitats are chiefly confined to the seashore or places near the sea, and with a preference for the limestone formation—very few inland stations are on record. Your correspondent, M. Kestner, has found it in one of the old inland stations on Lake Neuchatel. During a botanical excursion in Switzerland, in 1926, I found the *Adiantum* growing at another inland station, viz., at Aqua Rossa in Italian Switzerland. E. J. Lowe ("Native British Ferns") mentions a station at Las Caldas in Spain some 60 miles inland. I have met with *capillus-Veneris* in County Kerry and County Clare, in many places on the Riviera, Nice, Pont St. Louis, Gemalda, St. Sebastian, in the Colosseum in Rome and in the ruins of Pompeii, and at Biarritz.

W. H. STANSFIELD (Southport).

A CLASS FOR NORMAL SPECIES OF FERNS AT SHOWS.

It would, we think, be a good thing if we could have a class for normal species of ferns at some of our Shows. This would be of distinct educational value since many of them are unknown to the majority of visitors. The ferns exhibited in the British classes are, as a rule, varieties only as these are supposed to be of greater value than the normals. It is true that, in many cases, this is so, but the study of ferns should *begin* with the species. Most, if not indeed all, of them are beautiful objects when seen as well-grown and perfect specimens and are well worthy of cultivation. Apart from this the most beautiful varieties would be better appreciated if it could be seen, by comparison, how far they differ from the normals and in what respects they are superior to the wild ferns. There are some varieties which, in the writer's opinion, are inferior to the original species. They are " queer things " —mere curiosities and, in a few cases, they can only be called deformities. Most of the *depauperations* are of this class (fortunately not many of them are now cultivated) and the irregular *ramosums* and *furcatums* and some of the more complicated mongrels. Take the lady fern, for instance—the exquisite grace of the species is only surpassed by the plumose and super-plumose forms. The tasselled varieties are also beautiful so long as the cresting is symmetrical, but the cruciate forms, though not devoid of interest, and a certain beauty of habit, are, in most cases, less handsome objects than the normal species. The congested forms, again, are useful in their way, mainly as contrasts with the lighter varieties, and have a certain opulent charm of their own, but they cannot compete, in grace and delicacy, with *plumosum* and *kalothrix* and *Clarissima*, nor even with the normal species when seen in good condition. *Lastrea œmula*, as some of us saw it this year in Cornwall, where it is really at home, is one of the most beautiful objects in the vegetable kingdom, not surpassed by any other British species and by very few varieties. The one known variety of this fern, *L. aemula cristata*, although it may be worth growing as a " curio," is not nearly so beautiful as the parent species. Again, who wants a crested variety of the Parsley fern or of *Polypodium dryopteris* ?

Although we are pressing the claims of the species we are far from wishing to decry the varieties, many of which far surpass the species in interest and charm, but we suggest to fern-raisers and fern-hunters that they should produce more beautiful forms and not something which is merely a curiosity. The whole history of fern-growing as applied to the British species has been a search for improved varieties, and this is all to the good, but the quest for mere novelty has been sometimes carried too far and has resulted in the production of too many "queer things."

We append a list of British species suitable for cultivation and for exhibition. Filmy ferns, though very beautiful, are not suitable for exhibition as a rule as they can only be shown in glass cases and are consequently difficult of transport and not seen to advantage. The following species are all capable of being grown into handsome specimens and are suitable for the show table :—

Adiantum capillus-Veneris.
Allosorus crispus.
Asplenium Adiantum-nigrum.
,, *lanceolatum.*
,, *marinum.*
,, *trichomanes.*
,, *viride.*
Athyrium filix-foemina.
Blechnum spicant.
Cystopteris fragilis.
,, *alpina.*
,, *montana.*
Dryopteris (Lastrea) œmula.
,, *cristata.*
,, *dilatata.*
,, *alpina.*
,, *paleacea (pseudo-mas).*
,, *montana*
,, *rigida.*
,, *thelypteris.*

Osmunda regalis.
Polypodium calcareum.
,, *dryopteris.*
,, *vulgare.*
Polystichum aculeatum.
,, *angulare.*
,, *lonchitis.*
Scolopendrium vulgare.

SOME DIFFICULT BRITISH SPECIES.

The difficulty in growing a few of our native species of ferns arises largely from ignorance of their requirements, not only as to soil but to other conditions equally essential. There are a few which are really tender and can only be cultivated as a rule with the help of artificial heat. These species are *Adiantum capillus-Veneris*, *Asplenium marinum*, *A. lanceolatum* and *Anogramma leptophylla.* The *Adiantum* will thrive, as a rule, in a warm greenhouse if given a suitable soil, but it has established itself at Sale, near Manchester, on walls in a cold house and has persisted for many years and through a few very severe winters under these conditions. If grown in pots it should be given good drainage and a fibrous peaty soil with plenty of lime in it and it should not be watered overhead. The avoidance of wetting its fronds and rhizomes has more to do with its cultivation than is often realized, and it often perishes, even in a warm house, if persistently watered overhead. For *Asplenium marinum* the chief thing is warmth, but it also likes a well-drained soil, a little lime in some form, and perhaps *a trace of* salt—indeed, it is sometimes found growing in places where it is washed by the waves of the sea at high tide. *A. lanceolatum* grows not quite so close to the sea, but generally not very far away. It seems to dislike lime rather than otherwise, but the chief enemy is undoubtedly frost. *Anogramma leptophylla* must have immunity from frost and a moist atmosphere, and it should be remembered that it is an annual plant and always dies after producing a crop of spores. It should, therefore, be grown where the spores can sow themselves naturally and where the prothallia will be kept moist and warm during the winter and spring months ; also where they cannot be smothered by coarser vegetation such as liver-wort and other weeds. The best way to accomplish this is probably to grow the fern in a 9- or 12-inch pan, to cover this with a bell-glass as soon as the ferns begin to drop their spores, and to keep on the covering until the young ferns are appearing in the following year. Stray spores of all kinds are thus excluded to the greatest possible extent. No doubt spores of other ferns will find an entry and will germinate, but these intruders can be dealt with as they appear and either planted elsewhere or destroyed as may be desired. With regard to the alpine *Aspleniums*—*Germanicum*, *septentrionale*, *fontanum* and *viride*—it must be remembered that they are all rock plants and require a stony, well-drained soil, moist in summer and rather dry, but not dust dry, in winter when they are normally buried under snow. *A. viride* is a true limestone plant, but the other three do quite as well, and probably better, without lime. *A. Ruta-muraria* and *Ceterach officinarum* are not alpines, but require special treatment in the matter of drainage. They are both lime-lovers and will grow in almost pure lime-rubbish or old mortar. They should be kept fairly dry, especially during the resting season, but do not mind an occasional drenching during the growing period. They must, however, never be kept wet for any long time. The three species of *Cystopteris* are all deciduous and all lime-lovers, but this is especially true of *C. alpina.* They will take care of themselves during the winter if not dried up, but must not be kept saturated. They like plenty of moisture, with free drainage, during the growing season. The two *Woodsias*, *alpina* and *Ilvensis*, are also alpines and rock lovers. They prefer sand-stone or grit rock to lime and their treatment is simplified by the fact that they are deciduous like the *Cystopteris* and so do not need light during the winter, but can be stored anywhere so long as they are neither dried up nor swamped and are not exposed to severe frost. As soon as they begin to grow in the spring they require daylight with plenty of percolating moisture *and fresh air.* Another fern requiring treatment similar to the *Woodsias* is *Allosorus crispus,* but this is definitely a lime-hater and will not endure any appreciable quantity of this element in the soil. It is thoroughly hardy, but likes to have its crowns partially buried in slate-rock or flinty gravel and to send up its fronds through the interstices. It is not sufficient to supply *a patch* of lime-free soil in a garden which is naturally calcareous; perhaps it may do fairly well for a season or so, but in time worms bring up the subsoil and contaminate the patch of soil; the plant then dwindles and will soon die unless removed to permanently lime-free soil. If this be done it will revive and flourish unless very badly poisoned.

F.W.S.

THE ANNUAL MEETING IN 1934.

At the time of going to press the locality for this is still under discussion, but it will probably be in the South-West of England and early in July as in this year. The majority of votes, so far, favour Sidmouth, S. Devon, but Kingsbridge and Cheddar (Somerset) are alternative suggestions. All these places are on limestone or chalk formations. As soon as the matter is definitely settled members will be notified by circular so that arrangements for accommodation can be made in good time.

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Russell, L. A., F.R.H.S., Richmond, Surrey.
Saorstátt Éirann, Stationery Office, Publications Branch, Dublin.

Scott, F. W., Tullibole Castle, Fossway, Kinross-shire, Scotland.
Scott, W. D. S., The Gardens, Government House, Bulawayo, S. Africa.
Sheldon, J. J., F.L.S., Monkhams, Lower Road, Great Bookham, Surrey.
Sherrin, W. R., A.L.S., South London Botanical Institute, 323, Norwood Road, London, S.E.24.
Sinclair, James A., 57, Stradella Road, Herne Hill, London, S.E.24.
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Wynch, Mrs. Violet A., F.R.H.S., Pine Hill, Camberley, Surrey.

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THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

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VOL. VI. No. 10.

The British Fern Gazette.

SMITHSONIAN INSTITUTION
JUL 10 1934
NATIONAL MUSEUM

June, 1934.

EDITED BY

F. W. STANSFIELD, M.D., F.L.S.

(120, OXFORD ROAD, READING.)

PUBLISHED BY

THE BRITISH PTERIDOLOGICAL SOCIETY

President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

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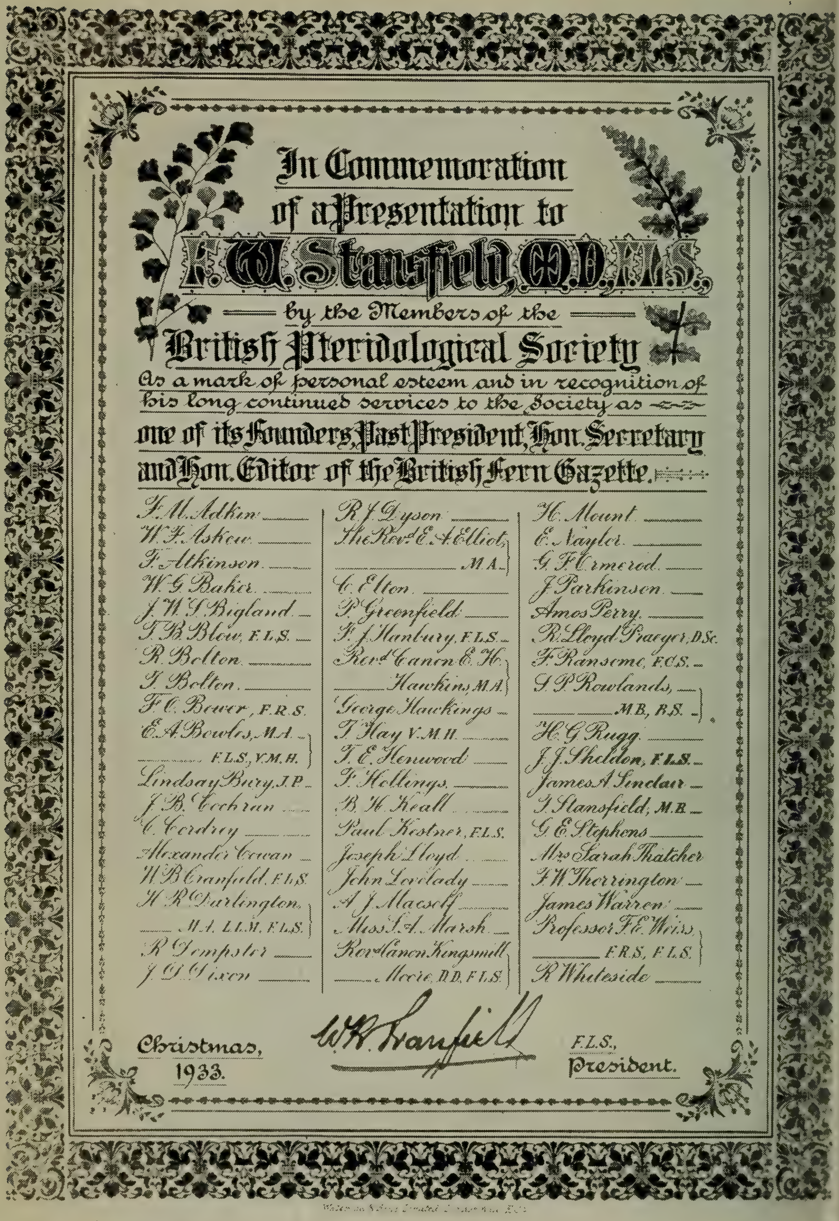

In Commemoration of a Presentation to F. W. Stansfield, M.D., F.L.S.,

by the Members of the

British Pteridological Society

As a mark of personal esteem and in recognition of his long continued services to the Society as one of its Founders, Past President, Hon. Secretary and Hon. Editor of the British Fern Gazette.

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R. Whiteside

Christmas,
1933.

W. H. Stansfield
F.L.S.,
President.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. VI. JUNE, 1934. No. 10

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EDITORIAL NOTES.

Our member, the Rev. E. A. Elliot, has been elected President of the North Staffordshire Field Club for the current year, an honour upon which we congratulate him. Mr. Elliot is anxious to get fronds, or parts, bearing ripe spores, of *Asplenium Adiantum-nigrum, A. lanceolatum, A. marinum, A. trichomanes, A. viride, Cystopteris fragilis, C. montana, Lastrea montana, L. æmula, L. pseudo-mas, L. thelypteris, Polypodium calcareum, P. phegopteris, Polystichum angulare*, and *Scolopendrium vulgare*, and will be glad to refund postage to friends who can send him any of them. We hope to be able to send him some, but not all, of them—*thelypteris, marinum* and *lanceolatum* will probably be the most difficult. Mr. Elliot has suggested that, as it will be 25 years next September since the first number of THE GAZETTE was published, a special number should then be issued. The question will be considered at the General Meeting in July.

We regret to learn that Dr. S. P. Rowlands has had a disaster to his collection of ferns. During his annual holiday last summer a friend who had undertaken to attend to his ferns during his absence was taken ill, so that the ferns had no water during the whole of a hot fortnight! The result may be imagined. Dr. Rowlands has gathered up the fragments that remain and is courageously "beginning again." We hope to be able to send him a few contributions to the new collection.

PRESENTATION TO DR. F. W. STANSFIELD.

On Thursday, January 4th, a small but very pleasant luncheon party was held at the New Criterion Restaurant, London, when a gold watch and chain was presented to Dr. Stansfield by the President, Mr. W. B. Cranfield, on behalf of a considerable number of subscribing members. The germ of the idea was a letter to the President from the Rev. Canon Kingsmill Moore, D.D., which was read at the last Annual Meeting, in which he suggested that an honorarium should be awarded to the Editor each year when the funds of the Society would permit. As a result a Sub-Committee was formed to consider what steps should be taken to recognize the services of the Editor and Secretary. This consisted of the President, Mr. T. B. Blow, Mr. Henwood and Mr. Sinclair, Mr. Sheldon being afterwards co-opted as a member. These gentlemen decided not to trench upon the funds of the Society, but to appeal directly to the members for voluntary subscriptions. The appeal produced a liberal response, but this naturally took some time and, as some members of the Committee were aware that Dr. Stansfield had been robbed, earlier in the year, of a watch and chain which he greatly valued, it was thought that the most suitable gift would be the replacement of this loss. Eventually a very handsome hunter-cased gold watch of high-class manufacture, with chain to match, was selected and purchased.

In making the presentation, Mr. Cranfield referred, in generous terms, to the work which Dr. Stansfield had done for the Society from the time of its formation. He had been the first President and had, at one time or another, occupied almost every office in the Society and had been the friend of all the members, past and present. The gift included also an illuminated commemoration card, containing the names of the subscribers, and an insurance policy on the watch and chain to the value of fifty pounds. The President suggested that the commemoration card (made by Messrs. Waterlow & Sons) should be photographed and should form the subject of the frontispiece of the next number of THE BRITISH FERN GAZETTE.

Dr. Stansfield replied in a brief speech of thanks, the gist of which has already been circulated to all the members.

There were present at the luncheon the members of the Sub-Committee, above enumerated, with the addition of Dr. Stansfield and Dr. T. Stansfield as guests. Professor F. E. Weiss, President of the Linnean Society, and Mr. A. J. MacSelf had also been invited, but were unfortunately unable to be present on account of important engagements elsewhere.

OBITUARY.

LAWRENCE.

Few were better known in the Horticultural World or more highly esteemed than the late Sir William Lawrence, Bart., Ph.D., V.M.H.

His father, Sir Trevor Lawrence, Bart., was President of the Horticultural Society from 1885 to 1913. Inheriting a love of flowers from generations of forbears, Horticulture and St. Bartholomew's Hospital were two interests which dominated his life.

Widely read and travelled, the deceased gentleman possessed an extraordinary knowledge of plants, whilst his enthusiasm for " out of the way " plants and the " Little People of the

Hills" was unbounded. The gardens and greenhouses at Burford Lodge contained wonderful collections and were the Mecca of most horticulturists. Those to whom he was known by his writings in the horticultural press will miss spirited and witty writings, whilst others who enjoyed his personal acquaintance will mourn the loss of a great-hearted and generous friend.

Sir William was Treasurer of the Royal Horticultural Society from 1924 to 1928. The most coveted horticultural distinction, that of V.M.H., was bestowed upon him in 1909. He was one of the Founders and First President of the Iris Society and the Alpine Garden Society. At the time of his decease he was Senior Almoner of St. Bartholomew's Hospital and his fatal seizure occurred whilst in its service.

He was laid to rest in Mickleham Church in the presence of a great gathering of friends, whilst simultaneously to a crowded congregation a memorial service was held at the Church of St. Bartholomew the Great.

Thus passes from our midst a most lovable character, the fragrance of whose memory will linger until we pass to "the undiscovered country from whose bourne no traveller returns."

W.B.C.

MOUNT.

All friends will learn with regret of the passing of our venerable member, Mr. Henry Mount, of Canterbury. Mr. T. B. Blow, who had known him for many years, writes us that he had a very short and painless illness and passed away peacefully on February 2nd, at the age of 87. He had attended meetings of the Society and did some judicious hunting on several of the excursions both in the South and in the North of England. He was buried at Oxford, where he formerly lived and was for many years in charge of the University Park. He had his training under the late Anthony Parsons at Danesbury House, Welwyn, when the very large outdoor fernery was established by William John Blake about 65 to 70 years ago. On leaving Danesbury House he went to

Penzance and enjoyed the friendship of Dr. Ralfs and Mr. Curnow, who were well-known naturalists in Cornwall at that time. I had a most interesting letter from him in July, 1933, making inquiries about the name and habits of the stem-boring Sawfly, *Heptamelus ochroleucus*, which had attacked his *Athyriums* at that time. His housekeeper and friend, Miss Dyason, writes of his enthusiasm for ferns up to the time of his death and of his success in growing them.—*Requiescat in pace.*

F.W.S.

THATCHER.

We regret also to announce the death of our member, Mrs. E. J. Thatcher, of the Manor House, Chew Magna, Somerset, who died on October 21st, in her 81st year. The deceased lady had been a cultivator and had taken an interest in ferns for many years, having been a friend of the late Mr. E. F. Fox (who collaborated with Colonel Jones in raising so many good varieties). She has been a friendly and interesting occasional correspondent during the period of her membership though we have never had the pleasure of making her personal acquaintance, which is a matter of additional regret.

F.W.S.

STANSFIELD.

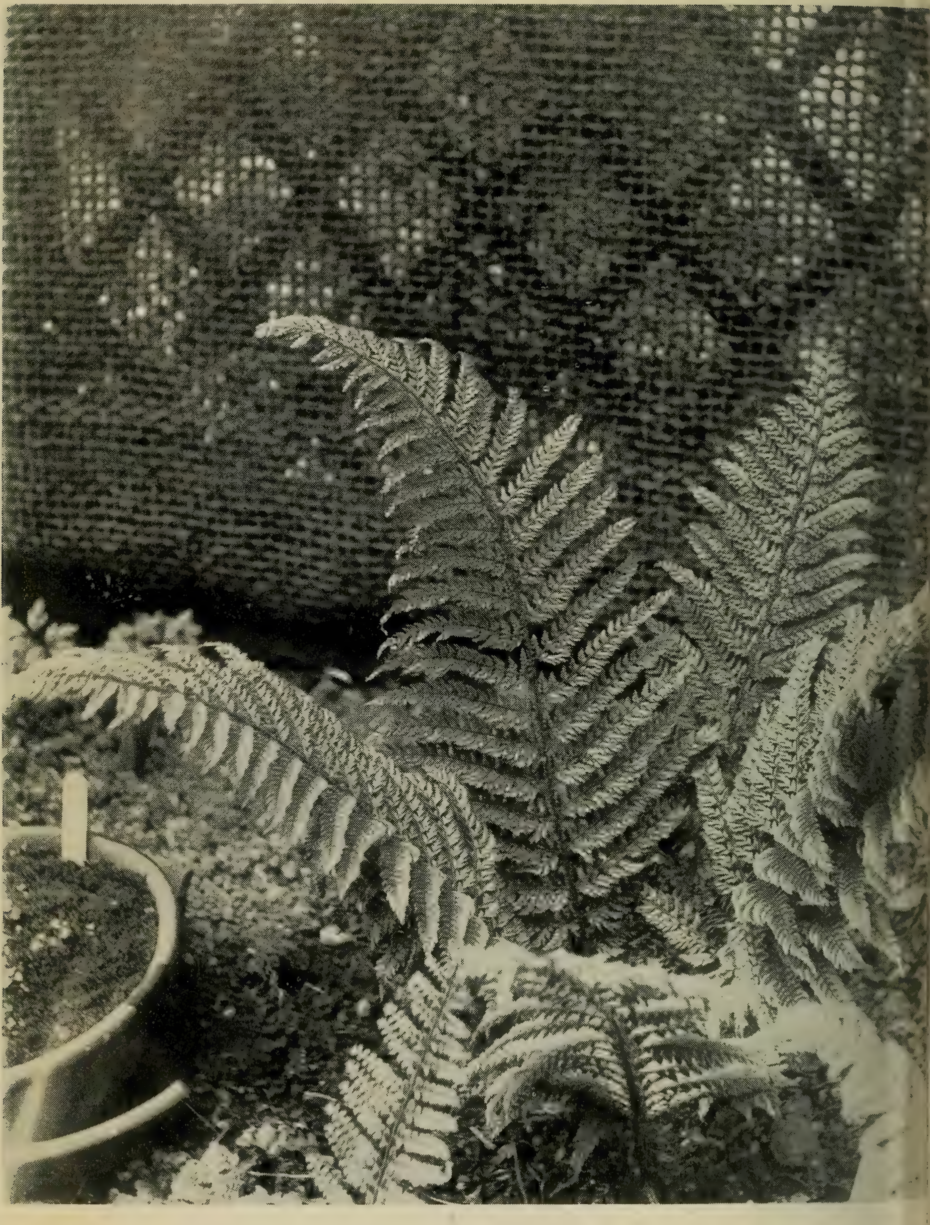
Another old friend who, though not a member of the Society and not a fern specialist, was a good botanist and a great gardener, was William Henry Stansfield, F.R.H.S., born at Todmorden in 1850, died at Tangier, N. Africa, on March 7th, 1934, and was laid to rest in the churchyard of St. Andrew's (the English Church at Tangier). He had hunted for plants all over the British Isles and also in the Pyrenees, the Alps and in N. Africa. He established a nursery for alpine and other hardy plants at Southport and was instrumental in introducing many "good things," not the least of which is *Campanula Stansfieldii*, a natural hybrid which Farrer describes as "a gift of Heaven" and "a treasure of the highest claims." Mr. Stansfield was a respected citizen of Southport and contributed and furnished a considerable public rock garden, which remains as one of the attractions of the town. We shall miss his cheery face at the Southport Show this year.

F.W.S.

THE DRY SUMMER OF 1933.

The dry weather of last summer will no doubt have been the cause of many hardships to ferns, but in two cases that seem worth recording there was ample compensation made later on, when the rain did arrive for a short while in September. Both instances occurred amongst my own ferns and both concerned varietal forms of *Cystopteris*, one being Dickieana and the other a crested variety, which looked by the end of August as if they could never hope to recover : this was in spite of carefully applied large doses of water, reserved for the most obviously needy specimens, and further attention to Dickieana in the shape of a loose covering of dry leaves ; but all in vain, one frond after another collapsed and died, and as a last hope, Dickieana was thoroughly soaked and a few hours later removed to a more sheltered spot and replanted under a piece of sandstone ; and that night the rain came.

Almost at once, or so it seemed, at any rate only some ten days later, tiny fronds appeared on Dickieana, and the surviving fronds of *cristata* took new life and others appeared ; the latter specimen had not been moved, as it was so well established that it seemed dangerous to touch it. Since then the compensation has come ; there was very little rain all the autumn, but the heat had gone and, in fact, there were sharp frosts on several nights before Christmas, some lasting a day or two and making the soil brick-hard ; but the two ferns went on flourishing, *cristata* developing new fronds all the while, though these will probably not mature, and the other showing the effects of frost by drooping its fronds



Polystichum angulare pulcherrimum, H.S., No. 5.

until rather milder times came and then raising itself up as vigorously as ever : and this has continued into the New Year, when a night of cold rain followed by frost and then a cold wind has ended *cristata's* performance ; and a slug, caught and destroyed on January 6th, has spoilt Dickieana's looks by biting off two of the four still green fronds, but leaving nevertheless two which seem to intend to carry on till the normal growing season comes.

It may be worth mentioning that the *cristata* is planted alongside the species *C. fragilis*, which had a quite ordinary season, though dying down rather sooner than usual.

E. A. ELLIOT.

POLYSTICHUM ANGULARE PULCHERRIMUM, H.S., No. 5.

This beautiful fern is referred to in "Fern Gossip" on another page. The photograph was taken before the fronds were quite fully expanded and, as the plant is growing in the open ground and the open air in somewhat close quarters, it was not an easy matter to arrange the camera so as to obtain a good general view of the plant and, at the same time, sufficient detail to show the character satisfactorily. The operator has been fairly successful, however, so far as the actual photograph is concerned, but the reproduction still remains to be seen and it is not to be expected that it can be quite equal in sharpness of detail to the original picture. The plant is a symmetrical shuttlecock of fronds 2 feet in length and every frond is in perfect character throughout. The very dry conditions of the soil and atmosphere during the period of spring growth have militated strongly against the full development of ferns both in the matter of size and character, but this one has stood the test better than most.

F.W.S.

SCOLOPENDRIUM HYBRIDUM, MILDE.

This curious and rare fern is figured in Britten's " European Ferns " and described as follows :—" Milde describes, under the name of *Scolopendrium hybridum,* a very interesting plant which he considers a hybrid between *S. Hemionitis* (or *S. vulgare*) and *Ceterach officinarum.* Only one example of this seems to have been found, and that was on an old wall of a vineyard near Porto Zigale in the island of Lossin ; Milde figures this specimen and our woodcut is based upon his representation. This author says that, at first sight, this plant would be taken for a monstrous form of *Ceterach*, but it is very different from this ; the fronds are almost entirely naked below and are thus very unlike the densely scaly fronds of the *Ceterach* ; they are heart-shaped at the base and elongated at the apex as is the case with the common Hart's-tongue."

It seems, however, that Milde's plant was not unique, as other plants have since been found in the same Adriatic island. Our friend and member, M. Paul Kestner, has sent us a frond from a later found plant. M. Kestner says that " the fern is certainly not a hybrid. There is no other *Scolopendrium* near it where it grows in these Adriatic isles, though there is *Ceterach* in plenty. The spores are normal and *germinate as well as those of any other Scolopendrium.* The illustration in Britten's ' European Ferns ' is drawn after Milde's figure. It is strange that it should be so much like Lowe's hybrid and it will be very interesting to compare them. If it is the same fern there may have been a confusion in Lowe's mind as it is quite possible that he may have raised the fern from (spores sent by) some correspondent. The Adriatic fern was known before Lowe's death. There is, of course, no impossibility in the crossing of *Ceterach* with a *Scolopendrium.* The genera are very near (each other) and we have the example of the N. American fern, *Asplenium ebeneum,* crossing with *Camptosorus rhizophyllus.* In one of its localities in Alabama the hybrid is even fertile and I have raised it from spores with success—my only success with a hybrid fern so far. I do not possess Milde's works, but Luersen gives a reproduction of Milde's woodcut and says Milde's conclusion was that it was a hybrid between *Ceterach* and *Scolopendrium.* Luersen doubted this bastard nature and so do the present continental botanists who place *S. hybridum* near *S. hemionitis* as a local variety."

We quote now from Druery's book on "British Ferns and their Varieties," p. 37 :—"Among hybrids between species we must not omit to mention Mr. Lowe's indubitable cross between *Scolopendrium vulgare* and *Ceterach officinarum.* On examination of the fronds it is seen that they are of *Ceterach* pinnation, though confluent at the top, and quite scaleless, while the fructification can be detected on the basal pinnae as in faced pairs, i.e. *Scolopendrium* fashion, and further up in single lines, i.e. in the character of the spleenworts. We do not know whether this plant is still alive, but the fronds *per se* establish its hybrid character and determine both parents with certainty. Fortunately, whether it is alive or dead, fronds are in the writer's possession as confirmation of its occurrence and of the description here given."

The present writer (F.W.S.) well remembers seeing a frond in Mr. Druery's collection pressed between two sheets of glass so that both sides of the frond could be examined. I also paid a visit to Mr. Lowe in the early 'Nineties of last century and saw the corpse of the actual plant which had recently died, but the fronds still retained their form and traces of colour. So far as one can remember, the fronds, both at Mr. Lowe's place and at Mr. Druery's, were less than two inches long and corresponded with Druery's description. It is unfortunate that no reference to this fern can be found in any of Lowe's books although his last work on ferns was published in 1895—not very long after the episode of the supposed hybrid. It is equally unfortunate that Druery's specimen seems to have been lost after his death and cannot now be traced. My recollection of both is that the plant was very similar to Milde's cut of the Adriatic fern, but that the frond, though similar, was more distinctly pinnate and had more of the outline of *Ceterach*. I had no doubt, at the time, that it was a hybrid any more than had Lowe or Druery.

M. Kestner has kindly sent me a frond of the Adriatic plant which had plenty of perfectly formed sporangia though most of the spores seemed to have been shed. I have sown the sporangia in the hope that there may be a few spores remaining and shall look forward with interest to the result of the sowing; only one speck of green which may possibly be a prothallas can be detected three months after sowing. M. Kestner's experience is interesting though rather tragic. In a letter of December 19th, 1933, he says: "One of the two seedlings of *Scolopendrium hybridum* which I have succeeded in keeping alive out of a large batch sown in 1932 has produced two bulbils and each started to grow two frondlets. The fern unfortunately died three weeks ago; one of the fronds has remained green so far and its bulbil is progressing, but has not yet sent out any root. I send you the frond from which I made my sowing: I got it from the professor of botany in Trieste. The plant is from the Isle of Lussin piccato in the Adriatic. It is found in several isles off the Dalmatian coast."

F.W.S.

NEW LIGHT ON ASPLENIUM FONTANUM REFRACTUM.

In The Gazette, Vol. V, p. 99, there is a brief history of this mysterious fern so far as it was then known. New light is cast upon the possible origin of this perplexing, and now lost, plant by a letter from our friend and member, M. Paul Kestner, to whom we are indebted for much valuable information and many interesting suggestions. We quote from the letter: "There is a fern described in Moore and Lowe and also mentioned by Druery: *Asplenium fontanum refractum* of which one specimen only seems to have been known (as a wild plant). This seems identical with a hybrid *Foresiacum* x *trichomanes* (*Foresiacum* is the calciphobe form of *fontanum* and exactly intermediate between *fontanum* and *lanceolatum*). This hybrid has been found at Brissago, Lago Maggiore, and it seems very fertile having covered several vineyard walls. Unfortunately it was collected in such quantities by two local men, to be distributed among botanists, that it looks as if it were extinct. I have seen several specimens of this hybrid in the herbarium of my friend, Dr. de Tavel, in Berne. Since Dr. Christ's death in December in his hundredth year (by accident) Dr. de Tavel is the foremost pteridologist in Switzerland, but, like so many others, he has never grown a fern nor tried to raise one from spores. It is unfortunate as he has very interesting European hybrids in his herbarium."

The description of *Foresiacum* seems to suggest that that fern may be itself a hybrid between *fontanum* and *lanceolatum*, and if that should turn out to be the case it may be that " refractum " had three species in its pedigree instead of only two as has been previously surmised. Fern growers can assist in clearing up this tangle by sowing together *fontanum* and *lanceolatum* to see whether they can raise *Foresiacum* and, in case of success, a further attempt can be made to reproduce " refractum " by hybridizing *Foresiacum* and *trichomanes!* This is an extensive programme of synthesis, but we give the idea for what it is worth and we propose to begin this year by sowing together *fontanum* and *lanceolatum*. Others may do the same and, in case of failure by one, two or three, the fourth may make a success. In the meantime, M. Kestner proposes to try to find the original hybrid at Brissago which is not very far removed from Locarno (of which we have all heard or read a good deal). We sincerely wish him success whatever may be the result of our own experiments.

F.W.S.

AN OLD FERN COLLECTION.

Some time ago a friend of mine, strolling through the local market, saw an old man selling some miscellaneous articles out of an old tin box, doubtless acquired at some sale. Among an odd assortment of junk, my friend saw two large books of pressed flowers and ferns, and noting their excellent condition, purchased them for a small sum. Knowing my interest in botany, he brought the books for my inspection. I must confess that I have never seen any botanical specimens so beautifully pressed and preserved as these were. About one half were of various flowers culled from her own garden or elsewhere. The remainder consisted of species of British ferns. One marvelled at the time and patience which had evidently been expended on this small collection. On the fly-leaf of one volume, written in the fine, spidery writing of a past generation, was the following dedication :

"To Miss Walker, Masborough House, with Mrs. Margaret Stovin's kind regards, Newbold, 5th Feb., 1833."

Mrs. Stovin, evidently a cultured lady and an able botanist, was unable to resist adding two quotations which seemed to her particularly apposite. They will bear repeating :

"From the first bud, whose venturous head
The Winter's ling'ring tempest braves,
To those which 'mid the foliage dead
Shrink latest to their annual graves ;
All are for use, for health, for pleasure given,
All speak in various ways the hand of Heaven."

The second is in prose :

"It is happy when among bright days and the sportive Zephyrs of Youth, we have made a provision of such pleasures as will enliven and warm the heart, and prevent the sinking under the cloudy sky, the chilling blast, and the faded landscape of declining age."

A long and interesting letter was enclosed, dated February 4th, 1833. Mrs. Stovin mentions "cholera" being rife almost everywhere except at Chesterfield (near her own home). After some details chiefly of domestic interest, she continues :

> " The preserving of plants is an interesting employment, but the getting of subjects to preserve is quite another thing. However, if I live and find favour in the season, I will change some of your specimens for better. As I know you are an admirer of the (to me) most interesting Fern tribe, I have added some duplicates I had of British Ferns ; they are correct, and may at least be of use to your ascertaining any you yourself may find."

Referring to damage done to her outdoor plants by a storm, she remarks that good pressing specimens of hardy ferns are often more difficult to obtain than those of the sheltered exotics. " I am thankful to say that they are not demolished, for some I can never expect to replace, and some will not grow but where they please. The *Adiantum capillus-Veneris* is only found in Ireland. You shall have a specimen of the Regal Royal Fern (I hope) next season."

In spite of all difficulties, Mrs. Stovin was able to send her friend excellent specimens of some twenty-two species, in fact about one half of those on the British list. Many were cultivated in her own garden, others collected in Derbyshire or elsewhere. All the commoner species were, of course, represented, and interesting bits of information concerning the source or habitat was added. The Black Spleenwort came from the famous Haddon Hall, and *Asplenium marinum* from Whitburn, Durham. A nice specimen of the Holly Fern, described as the Rough Alpine Shield Fern, was obtained from Westmorland and cultivated—apparently very successfully. Wales supplied several species. The *Ceterach* came from Talgarth, where it was said to be abundant; the Royal Fern from a bog near Bangor. *Adiantum capillus-Veneris* was labelled " Rare, Ire landand Glamorganshire only." The last specimen was a beautifully mounted one of the Lady Fern, and the donor was unable to resist the temptation of quoting to her friend the well-known lines:

“ Where the copse wood is the greenest,
Where the fountain glitters sheenest,
Where the morning dew lies longest,
There the Lady Fern grows strongest.”

No specimens of fern variation are included or mentioned, and one gathers that these were either practically unknown to, or ignored by, the author. In any case, the collection was made rather before the time when fern varieties were much sought after.

Apart from the excellent preservation and presentation of the specimens, there was, of course, nothing really remarkable about the collection. But in these days of hurry and bustle, it is very pleasant sometimes to slip back in imagination to the quieter days of a century ago, when leisure was more abundant and when nature study was considered a suitable occupation for cultured and gentle ladies.

This old collection brought with it that atmosphere of bygone days which most of us can only obtain at second hand. One cannot help wondering how many able botanists have sunk into undeserved obscurity with the passage of time, how many keen fern-lovers and cultivators of the past are now quite forgotten, and how many fine and possibly unique specimens have disappeared with their proud owners. One cannot answer these questions, but one is at least glad that a happy chance prevented the final disappearance of this small collection, made with care and patience by one who loved ferns.

S. P. ROWLANDS.

FERN GOSSIP.

As indicated in the Rev. E. A. Elliot’s contribution on another page the season of 1933 was a very trying one for ferns and it seems as though 1934 is likely to be equally if not more so. Our soil in Reading is a dry and calcareous one and a dry season generally punishes the ferns seriously however much they may be watered artificially. Basal rot has been very prevalent among the *Polystichums* and several large plants of the choicest varieties have either died or been reduced to mere fragments ; this has been most noticeable among the *plumosum rarefactum* seedlings and the original *rarefactum* seems to be moribund although not yet quite dead. Oddly enough, however, the best of all the seedlings, *pluma-Paradiseæ*, seems to have taken a new lease of life and is better than I have ever had it since its portrait was published in 1923 (Gazette, Vol. V, p. 9). It has even gone to the length of producing a couple of bulbils, both of which seem to be doing well. Another fern which has done exceedingly well is the original *P. ang. pulcherrimum variegatum* of Moly, which promises to surpass even its performance in 1932 when its praises were so eloquently sung by Mr. Cranfield (Gazette, Vol. VI, p. 208). Not only are the fronds, so far as developed, quite perfect in character, but they are larger and more vigorous than they have ever been since I have had the plant—over forty years—and, like *pluma-Paradisæ*, it has produced bulbils (three instead of two), a habit which it had apparently abandoned for the past eight or nine years. Both these ferns have been grown in the very limited accommodation of my small fern house and are effective testimony to the value of perfect shelter for ferns in a trying climate like that of Reading. All the *rarefactum* seedlings, other than *Paradiseæ*, had been planted out in the lattice-work shelters and have done well there until last year, but now they are all either dead or moribund though I potted them up in the autumn and put them also in the house. Another very beautiful fern which, however, has not had the benefit of glass protection, is *P. angulare pulcherrimum*, H.S., No. 5, which came from Sale in 1926. It is the most perfect *pulcherrimum* in *angulare* I have ever seen and seems to have a better constitution than any other of the seedling *pulcherrimums* of which I have seven or eight, all of exquisite beauty but all, apparently, rather poor growers. *P. ang. flabellipinnulum*—outside and unprotected except by the lattice shelter—looks exceedingly vigorous and healthy and is in perfect character throughout. *Blechnums* and *Lastrea montana* varieties—outside and necessarily in pots—mostly look well with the exception of *Blechnum sp. plumosum*, Forster, which looks old and tired. I hope someone will raise a new generation of this from spores. I made a sowing of it in 1932, but the spores germinated very sparsely, only about a dozen prothallia being produced and, although these still look healthy and vigorous, not a single frond has yet appeared among them. *Athyriums* outside, although obviously punished by the drought, look fairly well on the whole. I took up a plant of *A. f.f. fimbriato-cristatum* (the crested Clarissima) in March, intending to divide the clump as it had several crowns, but found these so closely connected and interwoven that it was impossible to separate them without causing serious injury to most, if not all, of them ; I therefore gave up the attempt and put the plant back in the same place after thoroughly digging the soil and working in some steamed bone flour. It is now a picture of health and the most forward and vigorous of all the lady ferns. On the other hand, Clarissima, a much larger plant, was not disturbed and did not commence to grow until a month later. *A. f.f. Kalothrix*, of course under glass, is very forward and a model of health and beauty.

To come now to the dark side of the picture, I regret to say that I was caught napping with *Asplenium viride plumosum* which was sending up a luxuriant circlet of fronds and looked very promising when we had two very hot and drying days early in May. It was watered and placed on a shelf in a shady place under glass to be out of the wind, but next day, to my horror and dismay, I found that half the fronds had shrivelled and the soil was dried up. It had been potted in a moraine mixture of limestone chips and fibrous loam, and as soon as it began to move in the spring it was set over a dish of water so that the bottom of the pot just touched the surface of the water. The heat and drought of the day—a very busy one for me—evidently dried up the water too quickly, with the result I have indicated. This is a catastrophe and almost a tragedy but, as there are still some green fronds left, I hope the plant will revive and begin to grow again after a period of rest during which it will need to be nursed, if possible more assiduously than it had been before. It is no exaggeration to say that I would prefer to lose any plant in the entire collection rather than this little fern, not only on account of its beauty and unique character, but because it was entrusted to me to save its life. It is almost as if a patient, upon whom one had been exercising all one's skill and attention for several years, were to relapse and perhaps die just when victory seemed to be in one's grasp! There is a little comfort and a suggestion of hope in the fact that a plant of the British type of *Asplenium Germanicum* (a present from a dear friend, the late Mr. W. B. Boyd) went through a somewhat similar experience last autumn. It also was accidentally dried up during the hot weather and most of the fronds perished. It was soaked and cared for and, though it remained frondless through the winter and started to grow rather late in the spring, it is now as healthy and vigorous as two plants of the same species sent to me from Switzerland by M. Kestner, which did not experience the drying up process. "What man among you, having a hundred sheep, if he lose one of them, will not straightway leave the ninety and nine in the wilderness and go after that which is lost until he find it?"

Another plant which came near to being a total loss this year is *Asplenium trichomanes confluens*, Stabler, the original "find" of this curious variety and still perhaps the most distinct. I had a single plant of it, with one crown, in the autumn when it looked fairly healthy. It was not neglected in any way, but in April it began to look tired and the incipient fronds ceased to develop. On being turned out all the roots were found to be dead and most of the caudex had apparently died from basal rot. There was no sign of weevils or other vermin. There was just enough caudex left to hold the fronds together so it was potted in fresh soil and placed under a bell glass where it remains for the present. The old flabby fronds have freshened up and new ones are beginning to show, so I hope and believe that its life is saved. *A. trichomanes confluens*, Smithies, an Irish "find" by an old friend, which looked well last season and began to throw up new fronds in spring, was found on examination to have had the whole caudex destroyed by a couple of fat *Otiorrhynchus* grubs so that is a total loss. Fortunately I had divided the plant a year ago and given half of it to my friend, Mr. Henwood, who is a champion grower. On going to see his collection his plant was found to be looking very ill—as bad as, if not worse than, my plant of Stabler's "find." All the fronds had lost their gloss and many were shrivelled. Mr. Henwood insisted upon my taking it for hospital treatment, so it was subjected to the same regime as *confluens*, Stabler, and put under the same bell glass. It is now beginning to sit up and take nourishment (from the air only as yet), so I hope it will also soon become a convalescent. I hope the variety may exist in other hands but, at present, I do not know anyone else who has it. *Confluens*, Mason, has not passed through any crisis and is in quite good condition. The three forms are very similar in character, but are each distinguishable by the expert eye, though it is not easy to describe in words of what the difference consists. Stabler's is perhaps the most robust of the three and has a stouter stipes than the others.

F.W.S.

P.S. (*on going to press*) : Yes, thank you—the distinguished invalid is progressing favourably so far.

POLYPODIUM VULGARE SERRA, J. A. WILSON.

This variety, although found in 1865, never seems to have got into general cultivation—in fact we believe that when the finder died (about 1912) he had in his possession the whole stock of the plant, and that was not very much. Three members purchased the stock and only had a small plant each.

Since then it does not seem to have increased much and, indeed, the present writer is not sure that there is in existence another plant besides his own which is not much more than a scrap. It seems to differ in constitution and in habit from the other varieties of the species. It grows very slowly; the rhizome is more slender and less scaly than that of the normal species or of any other variety, and it has a singular habit of growing out of the soil and rising on its tail like the caterpillar in "Alice in Wonderland." It produces sori sparingly, but we have never been able to collect any perfect spores from it. When in good health it is a beautiful and distinct variety though not to be compared, in the former respect, with the best of the plumose varieties such as those of Hadwin, Barrow and Whilharris. The late Mr. Wollaston, who is responsible for the name, described it as "the best biserrate variety," although Colonel Jones's nature-print, the only known figure of it, hardly shows any biserration. This portrait has been reproduced, though not very successfully, in Druery's "British Ferns and their varieties" (Appendix plate XLIX, p. 361). The figure does not exhibit the peculiar habit of growth of the plant as only two isolated fronds are shown. The extremely small punctiform sori can be recognized and are in strong contrast with the large well-developed sori of the normal species. The difficult and trying years of the war and the busy and anxious succeeding period have been responsible for the loss of a number of choice and rare ferns and this one has narrowly escaped with its life. We must now make an effort to multiply and distribute it. If plants could be raised from its spores the seedlings would probably have more vigour than the original.

THE ANNUAL MEETING, 1934.

As already announced by circular the Annual Meeting of the Society will be held on July 3rd, at 10 a.m., at the Bedford Hotel, Sidmouth, S. Devon. Some members have arranged to travel on the previous Saturday so as to look around the district before the meeting, but as this will be held on the Tuesday it will be practicable for those who do not wish to be away from home over the week-end to travel on the Monday and still be in time for the meeting. Some of us hope to remain in the district for a full week should the hunting turn out as good as is anticipated.

THE SOUTHPORT SHOW, 1934.

We have received a copy of the schedule of prizes at the Southport Show which is announced, no doubt with justice, as "the world's largest summer horticultural exhibition." The Show opens on August 22nd and continues until the evening of the third day. As usual, there are liberal prizes for collections of British ferns in no fewer than twelve classes, so that both large and small growers will be able to compete. We miss the offer of the Silver Challenge Cup by Messrs. Abol Ltd. for a group arranged for effect, but our Society has undertaken, for this year, to offer a new trophy of a piece of silver plate, value ten guineas, to be won outright by the successful competitor. In addition to the classes provided in previous years, there is, this year, a new class for six normal species of British ferns which is, we think, an important and valuable precedent as few people have any idea of what our normal species can do in the way of decoration when given fair treatment. Since not all our members can arrange to attend the formal annual meeting of the Society, wherever it may be held, the Southport Show acts as a subsidiary meeting place where acquaintances may be made and renewed and views exchanged. The Editor expects to be there and hopes to meet as large a number of members as possible whether they have been able to be present at the General Meeting or not.

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

F. W. STANSFIELD, M.D., F.L.S.,
120, Oxford Road,
Reading,
Berks.

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VOL. VI. No. 11.

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, F.L.S., "Monkhams," Lower Road, Great Bookham, Surrey.

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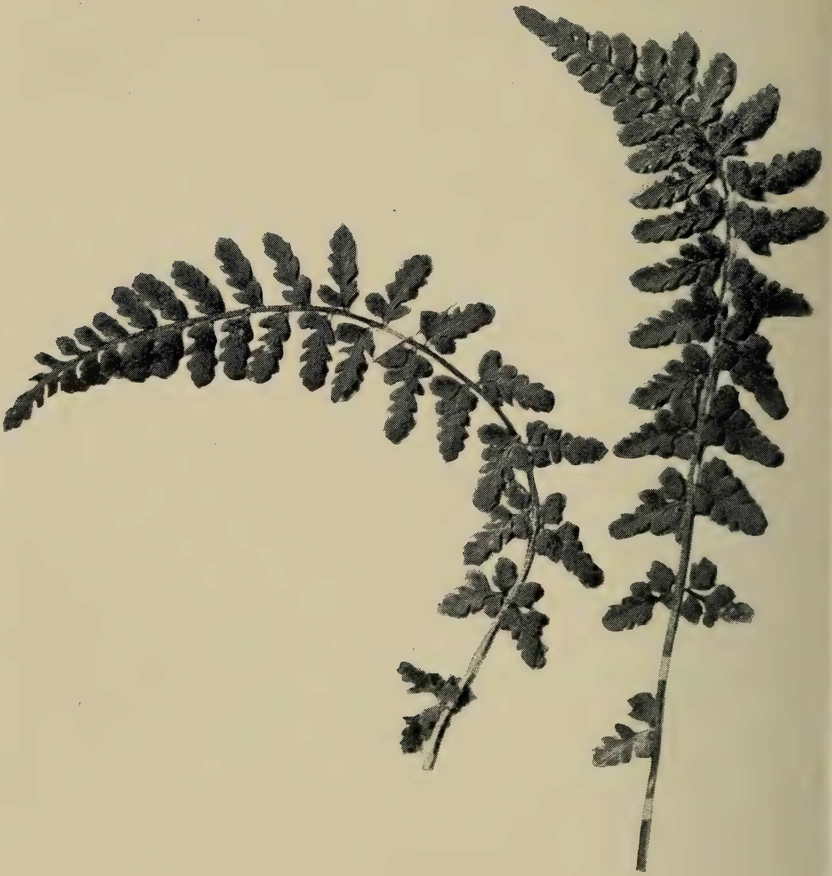

Asplenium Foreziacum, Le Grand~~e~~.

THE BRITISH FERN GAZETTE.

NEW SERIES.

Vol. VI. DECEMBER, 1934. No. 11

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FOREWORD BY THE PRESIDENT.

The occasion of the Silver Jubilee of the Foundation of The Gazette presents a fitting opportunity for a few words of greeting to the members of our Society who have done me the honour of electing me their President for the fifteenth year in succession, a compliment of which I am deeply sensible.

In spite of the ravages of time our membership is fairly maintained and some of our new members are as enthusiastic as were those of bygone times. Of late years only a few fine things have been found (though many have been raised), but when the standard of excellence is so high, this is not a matter for surprise.

Some of the most important finds during the lifetime of THE GAZETTE have been :—

Asplenium trichomanes incisum, Clementii.
,, ,, *cristatum*, Mrs. Rowlands.
,, ,, *foliosum*, Cowan (Italian).
Ceterach officinarum ramo-cristatum, Kirby.
Dryopteris montana plumosa, F.W.S. (Wales).
Phegopteris dryopteris plumosa, Christopherson.
Polypodium vulgare omnilaceum (Cornish var.).
,, ,, *semilacerum falcatum*, O'Kelly.
Blechnum sp. serratum, C. Henwood.
Asplenium viride plumosum, Greenfield.
Polystichum angulare cristatum, Hawkins.
,, ,, *foliosum*, Walton.
,, ,, *acutilobum macrodon*, T.S.
,, ,, *lineare caudatum*, T.S.
,, ,, *acutilobum falcatum*, Thorrington (1934).

while a few of the best things raised during the same period have been :—

Athyrium f.f. kalothrix lineare, H.S.
,, ,, *kalothrix cristatum*, H.S.
Dryopteris montana congesta cristata, Cowan.
,, *paleacea apospora cristata*, Cropper.
Polystichum aculeatum gracillimum (numerous forms).
,, ,, *plumosum*, Green.
,, ,, *pulcherrimum*, improved forms, Cranfield and Druery.
,, *angulare pulcherrimum*, numerous forms by H.S., F.W.S., Cranfield, Sheldon, Bolton, etc.
,, ,, *plumosum rarefactum*, H.S., and its offspring.
,, ,, *plumosissimum pellucidum*, H.S. (several forms).
,, ,, *prothalliferum superbum*, H.S.
Polypodium v. Cornubiense grandiceps, Cowan.
Phyllitis Scolopendrium plumosum, H.S.
,, ,, ,, Perry.

It is regrettable that many of the varieties which were plentiful in the past appear to be lost to cultivation. The numerous varieties of *Asplenium marinum* may be instanced, lack of hardiness being the probable reason. The same applies to forms of *Adiantum capillus-Veneris.*

There is one golden rule which all fern growers should observe, viz., to share with others any choice varieties they may possess to ensure as far as possible that should their own plants succumb they may be safe in other hands.

I should like to emphasize the ever-increasing debt of gratitude the members owe to our Secretary and Editor of THE GAZETTE, whose enthusiasm is unbounded and whose erudition is unrivalled. Of Dr. Stansfield one might almost paraphrase the words of Shakespeare : " Age cannot wither nor custom stale his infinite variety."

May I urge every member in the coming year to do his best to advocate the cultivation of a few hardy ferns upon all his friends and to endeavour to introduce new members to augment our numbers.

W.B.C.

EDITORIAL NOTES.

Since our last list of members was published Mr. G. W. E. Loder, M.A., F.L.S.. has become the Right Honourable Baron Wakehurst of Ardingly, an honour upon which we offer him our somewhat tardy congratulations. We are glad to welcome as a new member Dr. F. de Tavel, of Bern, the eminent Swiss pteridologist, who has joined the Society on the introduction of M. Paul Kestner ; also Mr. Arthur Pyke, of Westwoods, Windlesham, Surrey, introduced by Mr. Cranfield. We regret the loss by death of Miss Ellen A. Willmott, of Great Warley, the eminent horticulturist and writer. Our President, who knew her well, contributes a kindly obituary notice on another page.

Our friend, Dr. S. P. Rowlands, has sent us, to be nursed, a very promising fern which he found while on his annual holiday in South Wales in August of this year. It is a tiny plant of *Adiantum c. Veneris*, having only a couple of fronds of about an inch in length, but having, relatively, very large pinnules, deeply incised after the manner of the barren ones of *A.c.V. imbricatum*. Should it prove fertile it seems likely to simulate that variety, but if not it may resemble the, now probably lost, *Cornubiense* or the equally beautiful "Sibyl" raised by the late E. J. Lowe and figured on p. 78 in his last book, Fern Growing," 1895. In any case, Dr. Rowlands's find is a very interesting thing and it is a great responsibility to have the charge of it. *Asplenium viride plumosum*, which came near to being a casualty last May, though still small, is now well established and seems likely to make a substantial plant next season.

We have received, from M. Kestner, spores of *Asplenium Foreziacum* or *Foreziense*, a new European fern which is intermediate in character between *A. fontanum* and *A. lanceolatum*, so we shall be spared the trouble, and probable disappointment, of trying to raise this species by hybridizing *fontanum* and *lanceolatum*. M. Kestner thinks the new fern is not a hybrid because, although almost exactly half way between the other two, it reproduces itself, in Nature, freely from spores. The fronds sent are loaded with ripe spores which look perfectly normal and very different from those of most known hybrid ferns. We have every hope of being able to raise, from them, a good crop of seedlings which we propose to distribute in due time.

OUR FRONTISPIECE.

Asplenium Foreziacum or *Foreziense*.

We present a photograph of the fronds kindly sent by M. Kestner of this very rare European fern, the name of which seems not yet to have been finally settled, but which was comparatively recently discovered by M. Le Grand in the mountains of Forez in Central France and which has been also collected by M. Kestner near Brissago on Lago Maggiore. It will be noticed that the lower pinnæ are deflected after the manner of the long-lost *A. refractum*, which character has probably given rise to the idea that it was one of the parents of that mysterious fern, *A. trichomanes* being the other Some colour is given to this theory by the fact that a fern, said to resemble *refractum*, has recently been found, in some quantity growing intermixed with *Foreziacum* and *trichomanes*, in the neighbourhood of Brissago, but has apparently been practically exterminated by local collectors. M. Kestner has, however, found and rescued *one plant* which is thought to be this hybrid. Our friend has generously sent us a frond from it but, in the opinion of the present writer (one of the few survivors of those who saw the original *refractum* alive) it is not *refractum*, but rather resembles an incised and fertile form of *trichomanes*. We trust the plant will become established and flourish under cultivation, in which case its identity, or otherwise, with *refractum* can be definitely settled. F.W.S.

OBITUARY.

Miss ELLEN A. WILLMOTT, F.L.S.

On September 27th there passed away with tragic suddenness a lady who was probably better known in the world of horticulture than any of her sex, for it may be said that Ellen Willmott possessed a knowledge of horticultural subjects seldom exceeded.

Her beautiful home at Great Warley contained collections gathered from all parts of the world, the result of plant hunting and exploring expeditions to which she was a generous supporter. She had done much to encourage the development of the daffodil and in days gone by showed some wonderful exhibits. Her monumental work on the genus, *Rosa*, ranks as a classic.

The deceased lady was an accomplished linguist, whilst music and other arts claimed an important share in her broad sympathies. In former years she cultivated Alpine and other flowers at Aix-les-Bains and on the Riviera. Her horticultural sympathies were encouraged and developed by William Robinson, Henri Correvon, who are happily still with us, the late Mr. Bennett Póé and many others whose friendship she enjoyed.

The deceased lady had served upon the Daffodil and Floral Committees of the Royal Horticultural Society for many years, where her extensive knowledge of uncommon plants, shrubs and trees was of great benefit, and in 1897 the honour of the Victorian Medal of Horticulture was conferred upon her. In 1904 she was elected to the Fellowship of the Linnean Society, being among the first women to receive the distinction.

As a member of our Society her interest in ferns lay more in the direction of uncommon species than abnormal varieties, but she possessed the majority of the finer forms. Many species and varieties in the floral world bear her name as a lasting tribute to her enthusiasm.

A Memorial Service was held at the Roman Catholic Church in Farn Street, attended by representatives of the various Societies in which the deceased lady was interested.

She was laid to rest in the Roman Catholic Cemetery at Brentwood in the presence of relatives, intimate friends and employees.

Thus passed from our midst one of the best known individuals in the horticultural world, whose generosity and broad sympathies endeared her to a wide circle of friends.

W.B.C.

THE ANNUAL MEETING, 1934.

The Thirty-ninth Annual Meeting of the Society was held at the Bedford Hotel, Sidmouth, S. Devon, on July 3rd, 1934. There were present :—

Mr. W. B. Cranfield, F.L.S., F.R.H.S. (President), Enfield Chase.

Mr. Robert Bolton, F.R.H.S., Birdbrook, Essex.

Mr. T. B. Blow, F.L.S. (Vice-President), Welwyn, Herts.

Mr. T. E. Henwood (Vice-President), Reading.

Mr. J. J. Sheldon, F.L.S. (Treasurer), Great Bookham.

Mr. Jas. A. Sinclair, London.

Mr. F. W. Thorrington, Little Baddow, Essex.

Dr. F. W. Stansfield (Hon. Secretary), Reading.

The Minutes of the last meeting were read, confirmed, and signed by the President.

The President welcomed the members, congratulating them on the promising character of the region as a hunting ground for varieties and as giving a display of a large number of species of ferns.

Letters were read from Canon Kingsmill Moore, Mr. Alexander Cowan and Mr. G. E. Stephens regretting their inability to be present at the meeting. Mr. P. Greenfield had also intended to be present, but had been prevented by the sudden death of his father, Mr. J. H. Greenfield. A letter was also read from Mr. O. C. Keall, of Chelmsford, announcing the sudden death of his father, Mr. B. H. Keall.

The Hon. Secretary read his report as follows :—

" Mr. President, Ladies and Gentlemen,

The Society has been grimly holding on during the past year. The ferns in our collections have also been grimly holding on against adverse conditions and some of them, like some of our members, have succumbed. We have lost four members by death, including Sir William Lawrence, Bart., Mr. Henry Mount and Mrs. E. J. Thatcher, whose deaths were announced in THE GAZETTE recently issued. Since then I have learned of the death of Mr. B. H. Keall, who joined the Society in 1932 and who was a valuable link with the past as the son of the late Mr. W. J. Keall, of Wantage, the finder, long ago, of *P. angulare brachiato-cristatum*, Keall, *Scolopendrium v. crispum*, Keall, and other good things. Mr. B. H. Keall, during his two years of membership, has taken an increasing interest in ferns, has corresponded with myself (as probably with other members) and has maintained a collection of British ferns, partly, no doubt, the remains of his father's collection. One or two members have resigned and two have been lost sight of, letters to them having been returned marked ' Not known ' or ' Gone away.' The nett result is 106 Subscribing Members remain and eight Honorary

Members. A considerable number of copies of THE GAZETTE have been sent away to institutions and to persons known to be interested in ferns with a view to the possible acquirement of recruits. The old members are mostly holding on but, although we have still quite a number of elderly members, we do not obtain a sufficient influx of new blood, and especially of young recruits. The Southport Corporation continues to encourage the cultivation and exhibition of ferns by liberal prizes at their great summer show, and our Society has, this year, decided to offer a special trophy for the best group of British ferns arranged for effect since it is at Southport, more than anywhere else, that the beauty and interest of our native ferns is conspicuously brought into public notice.

Our Society was invited, last year, by our Vice-President, Mr. F. J. Hanbury, to visit his interesting garden at East Grinstead, and the pilgrimage of some dozen or more members and friends was made to Brockhurst a week or two ago, when a most enjoyable time was spent in examining the famous rock-garden and other grounds which contain, among many other interesting plants, a fair collection of British ferns. Not the least interesting thing seen was a living plant of the *Cystopteris alpina*, found in Teesdale many years ago by the late James Backhouse, of York. It appeared to be practically identical with the forma *dissecta*, which has been introduced from Switzerland, and was undoubtedly the true *alpina* of Desvaux, which is more than can be said of the Low Leyton fern which has been described and figured under this name and was the original and principal record of the occurrence of this species in the British Isles. Mr. Hanbury also had plants of this latter which appeared to be a dwarf and blunt form of *C. fragilis*. It has long ago disappeared from the Essex habitat, but specimens are preserved in the Edinburgh Museum and, with them, Mr. Hanbury's plants appeared to be identical."

F. W. STANSFIELD.

The Hon. Treasurer, Mr. J. J. Sheldon, read his annual Report as follows :—

BALANCE SHEET.

Income.	£	s.	d.	Expenditure.	£	s.	d.
Balance from last year	68	0	7	Expenses at Annual Meeting	4	4	6
Subscriptions received	41	14	0	Affiliation Fee, R.H.S.	2	2	0
Sale of GAZETTES ...		2	0	GAZETTE, Dec., 1933	18	10	0
Advertisement ...	2	2	0	,, June, 1934	13	6	4
				Cheque Book ...		2	0
				Printing Sundries ...	1	7	0
				Postages	3	14	2
				Contribution to Dr. Stansfield's Testimonial	8	9	11
				Balance in hand ...	60	2	8
	£111	18	7		£111	18	7

Audited and found correct, June 28th, 1934.

(Signed) PERCY GREENFIELD,
Hon. Auditor.

It was proposed by Mr. Sinclair, seconded by Mr. Bolton, and carried *nem. con.* : " That the Secretary's and Treasurer's Reports be received and adopted."

It was proposed by Dr. F. W. Stansfield and seconded by Mr. Henwood : " That Mr. W. B. Cranfield, F.L.S., F.R.H.S., be re-elected President." Carried unanimously.

Proposed by the President and seconded by Mr. Sheldon : " That the old Vice-Presidents be re-elected *en bloc.*" Carried *nem. con.*

Proposed by Mr. Henwood and seconded by Mr. Bolton : " That Mr. Sheldon be re-elected Treasurer." Carried *nem. con.*

Proposed by Mr. Blow and seconded by Mr. Sinclair : " That Dr. F. W. Stansfield be re-elected Hon. Secretary and Editor of THE GAZETTE." Carried *nem. con.*

Proposed by Mr. Sheldon and seconded by Mr. Thorrington : " That Mr. P. Greenfield be re-elected Hon. Auditor." Carried *nem. con.*

Proposed by Mr. Blow and seconded by Dr. Stansfield : "That the old Committee be re-elected *en bloc*." Carried *nem. con.*

Proposed by Mr. Whiteside (by letter) and seconded by Dr. Stansfield : "That Mr. C. W. Grubb, Brookfield Nursery, Bolton-le-Sands, be elected a member of the Society." Carried *nem. con.*

The Revd. Canon Kingsmill Moore sent a considerable bundle of fronds for examination, including *P. angulare plumosum*, Elworthy, *P.a. divisilobum venustum*, *P.a. divisilobum plumosum laxum* and *P. aculeatum pulcherrimum*, K. Moore, the last a seedling which had come up, self-sown, out of doors in the Canon's garden. This last was distinct from the numerous other seedlings which have been raised from this source being in the way of Mr. Edwards's seedling and Dr. Stansfield's, but was more divided than either, approximating somewhat to the character of Green's *plumosum*. For this fern Canon Moore was awarded the Society's certificate.

Mr. Sheldon also exhibited a considerable collection of fronds, mostly finds or seedlings of his own, but including a neat crested form of *Athyrium f.f. cristatum*, found last year in Cornwall by his son, Dr. Colin Sheldon.

Mr. Sheldon was awarded certificates for :—

(i) *P. angulare inciso-setosum*, a very handsome feathery and setose but fertile form, raised from spores.

(ii) *P. angulare multilobum*, Sheldon, a wild find by himself.

(iii) *P. angulare acutilobum laxum*, Sheldon, also his own wild find.

A letter was read from Mr. Reginald L. Hine, F.S.A., F.R.Hist.Soc., Willian Bury, Letchworth, Herts, appealing for a donation towards the cost of publication of the Natural History of the Hitchin and District Regional Survey Association. The appeal was supported by Mr. Blow as a deserving object. Although most of the members present were quite in sympathy with the object of the Hitchin Association, it was considered by the majority to be outside the scope of our Society's special work for which the funds are already inadequate. No proposition was carried and consequently no grant made.

PLACE OF MEETING NEXT YEAR.

It was resolved, on the motion of Mr. Bolton, seconded by Mr. Thorrington : " That the place of meeting for 1935 should be left for the Committee to decide as last year."

The party generally remained for about a week at Sidmouth, where the Bedford Hotel afforded comfortable accommodation, and most of the lanes within easy reach of the town were visited and examined for ferns of which a great wealth of species was found, *P. angulare* being perhaps the most abundant, but *P. aculeatum*, *Scolopendrium vulgare*, *Polypodium vulgare*, *Asplenium Adiantum-nigrum* and *A. trichomanes*, *Lastrea filix-mas* and *L. paleacea* were also fairly plentiful. *L. dilatata*, *Athyrium f.f.* and *Blechnum spicant* were seen sporadically where there was little or no lime in the soil, as was the case about Otterington. Salcombe Hill proved to be good ground and the regions about Sidbury, Branscombe and Colyford were visited. Mr. Sheldon found a promising *angulare perserratum*, and Mr. Bolton a couple of very foliose incised *aculeatums* and a large *Athyrium* with sharply reflexed pinnules ; Dr. Stansfield came across a decent crested *angulare*, but one of the best finds and certainly the most striking was an *angulare acutilobum* with narrow falcate pinnules somewhat on the lines of Moly's *divisilobum folcatum* but not having the sweeping curved pinnæ of that beautiful fern. This was a single crowned plant with erect 3 feet or longer fronds growing on the sunny side of the road and a most conspicuous object to all who had eyes to see. Mr. Thorrington was the first to see it and consequently it was his prize, but everyone who wished for them had spores from it as these were plentiful and just ripe, so we may reasonably hope for several crops of seedlings from this source. On the whole, the excursion was considered to be one of the most successful in the matter of finds which the Society has ever made. It was certainly a most enjoyable one from every point of view. May there be many more of the same kind.

BRITISH FERNS AT THE SOUTHPORT SHOW, 1934.

Again the Southport Summer Show, speaking generally, was a magnificent success and again Hardy Ferns, and especially British Ferns, were shown more effectively than at any other exhibition in Britain or, perhaps, in the world. They occupied the greater part of one large tent. Again the groups, " arranged for effect," were the cynosure of every eye although, as in 1933, the season had not been a kindly one for ferns. In this class Messrs. Bolton took first prize with an admirably arranged group, which contained a large number of rare and beautiful things, including *A. f.f. clarissima*, *P. angulare perserratum*, Patey, *A. f.f. uncoglomeratum*, *Adiantum cap.-Veneris imbricatum*, etc. Mr. Lloyd was second with an equally well-arranged group which, however, did not contain quite so many choice things and well-grown specimens. Mr. C. W. Grubb, a new competitor, was third with a beautifully fresh and clean group which, however, showed a certain monotony from the great predominance of dwarf crested *Scolopendriums*. Mr. Lovelady was fourth with a group which might well have come in third if they had suffered less from the effects of the dry summer. In the classes for twelve and six British ferns there was good competition, all the exhibits being well up to show standard. In the twelves the prizewinners were Messrs. Bolton, Grubb, and Lloyd in this order, and in the sixes Messrs. Bolton, Grubb and Lovelady.

The new class for six normal species of British ferns was a disappointment as there was hardly an exhibit of first-class quality. Possibly this was owing to the fact that the competitors had not adequate time to prepare their exhibits for the event, most of them showing evidence of somewhat hasty improvisation. We hope that, in another year, better preparation will be made for this class so as to show something of what our normal ferns are really capable with fair treatment.

In the remaining classes the prizes were fairly evenly distributed among the usual competitors, Messrs. Bolton, Askew, Lovelady and Lloyd ; Messrs. Grubb, Luckin, Bauchin and Monkhouse and Mrs. Law, as comparatively new competitors, also came in for a share of the honours.

"LASTREA DILATATA BOYDII" (F.W.S.) AND NEPHRODIUM SUBALPINUM BORBASIO.

This interesting fern (Boydii) was found by our late member, Mr. W. B. Boyd, of Faldonside, Melrose, about the time when the present century was young, but we have been unable to ascertain the exact date as Mr. Boyd left few records of his finds and none of this particular one. He sent a frond to the present writer about 1908 with the inquiry whether the fern was *Lastrea remota.* I replied that it was certainly not *remota*, but I thought it might be a hybrid between *filix-mas* and *dilatata* as it had a good deal of the general habit of *remota*, but had also something of the median dark line in the scales which is characteristic of *dilatata* but of no other British species. When I met Mr. Boyd afterwards he told me that when he found the plant he, at first, regarded it as " a golden form of *filix-mas* " ; i.e. it was the yellowish colour which first attracted his attention. " Boydii " has the general habit of *dilatata*, i.e. deltoid fronds with a much longer foot-stalk than *filix-mas.* The texture of the fronds is thicker than that of *dilatata* and the pinnæ are less divided than in that species. The outline is a more elongated deltoid than in *dilatata* and occasionally a frond of sublanceolate outline, approximating to that of *filix-mas*, it produced. The stem-scales nearly all have some trace of the dark median stripe of *dilatata* though this does not extend to the tip but generally breaks off abruptly about half-way up the scale. Occasionally a frond is produced in which the scales are concolorous like those of *filix-mas.* It produces, apparently, plenty of spores and these, unlike those of *remota*, are fertile. I made a sowing of them, in 1916, which germinated freely and produced plants but, owing to the distractions and preoccupations of the war, I lost the batch before the ferns came to maturity. I was, however, satisfied that the plant was fertile and consequently abandoned, for the time, the idea that it was a hybrid. It appears now, however, from recent correspondence with M. Kestner, that a fern has been found in the Vosges mountains which is regarded as a hybrid between *filix-mas* and *dilatata* and which reproduces itself freely in a wild state and takes on the habits of a species having colonized considerable tracts. It has been named *Nephrodium subalpinum*, Borbasio, and the Latin description corresponds closely with that of " Boydii." I have sent a frond of the latter to M. Kestner with a request that it may be compared with " *subalpinum*." There is also reported to be found in Switzerland a hybrid *paleacea* × *dilatata*, but I have not yet seen a description of this. The yellowish colour and somewhat coriaceous texture of Boydii suggest that it may be this hybrid rather than *subalpinum*, but, on the other hand, the sori of Boydii have deciduous indusia much more like those of *filix-mas* than those of *paleacea*. The matter can, however, be definitely settled when the three forms come to be compared with each other. I have not seen fronds of either of the continental hybrids so must withhold judgment for the present. I append a free translation of the published French description of *subalpinum* of M. Emile Walter :—

" *Nephrodium subalpinum*, Borbasio (*dilatatum* × *filix-mas*) : Plant very near to *N. remotum* (*spinulosa* × *filix-mas*) with which it is often confused and from which it is mainly distinguished by the following :—Fronds more or less clothed with short glandular, yellowish scales ; leafy part deltoid, sub-pinnatifid, the pinnæ scarcely decreasing (towards the base) ; pinnæ long drawn out (the upper pinnatified, the lower bipinnatifid) touching each other or slightly separated ; stipes usually half the length of the lamina ; scales generally two-coloured, russet on the edges, blackish in the middle ; indusia more or less glandular. Discovered by the paleontologist, Hauchecorne, of Berlin, in the Vosges, where it is scattered, often in small colonies, sometimes isolated, in the region of the pines and beeches at an elevation of between 700 and 900 metres (say about 3,000 feet). It requires as conditions a granite soil with a minimum of lime and an abundant rainfall. It is inclined, in the Hohwald, to replace its parents and to take on the appearance of a species."

F.W.S.

FERN GOSSIP.

Our Editor's valuable article, " Fern Gossip," coupled with his invitation, encourages me to offer something on parallel, rather than similar, lines. None of us can equal Dr. Stansfield's broad knowledge. He seems to know when all ferns were born, and to suffer disappointment if he cannot attend their obsequies.

But, on a level lower than his, growers might help one another by setting down their experience. Both failures and successes are instructive.

It has given me pleasure each year to submit some of my best fronds to our Annual Meeting. They represent my successes ; but I have also had failures.

One year I owned a specimen plant of Dr. Stansfield's *P.a. rarefactum*, so fine that I sent one of its fronds to the Annual Meeting. Next year, without any cause that I can even imagine, it was dead. Ferns, as recent articles have shown, are often long-lived ; but, like men and women, their tenure of life is uncertain. There have not been many deaths in my ferneries. Some are explicable ; that pestilential Helxine destroyed *P. vulgare trichomanoides*, and lime-haters, such as *Blechnums* and *Lastrea montana*, have always gradually faded away. A few others, like the *rarefactum*, have perished without any apparent cause.

Passing to my experience of the conditions in which ferns flourish best I find shelter and aspect most important. A splendid specimen of *P.a. div. robustum* became too big for its situation. The measurement across was nearly 8 feet. It was moved to a site where the aspect (N.E.) was correct, but which was much exposed to our prevalent N.W. winds. As the result it has shrunk (the year after moving) to half its size. There is nothing unhealthy about the plant, but it no longer flourishes. Another interesting illustration of the results of giving or withholding shelter is furnished by my experience with Druery's beautiful *A. f. f. plumosum crispatum superbum.* When first produced, Queen Victoria accepted a plant and certainly it well deserves Royal honours. Till this year I have not been able to put this *plumosum* on the show tables in good condition. Recognizing its susceptibilities I have always grown it in a sunk frame, where wind does not touch it and sun seldom comes. Always it began well, but in June and July the sun, at its highest, broke on the frame for a short time daily. In consequence the fresh green of the fronds faded, and the plant went " off colour." This year I planned a high wooden shelter, no sun touched the fern, and it was one of the most lovely exhibits in the R.H.S. Show.

The only fern which, to my knowledge, is more or less proof against wind and sun is *Polypodium vulgare.* A group of *Cambricum* flourishes for me on the top of a rough stone tower ; it is wholly exposed to N.W. winds and in sun many hours, at any season. In our humid climate the tops of walls and the trunks of trees are often luxuriously clothed with this fern. It is at its best when the hours of sun are limited. To wind it seems quite indifferent.

Beside *P. vulgare* some might place *Osmunda,* and certain *Aspleniums, Pteris aquilina* and *Blechnum spicant.* The royal fern is to be found in bogs where winds abound, and sun has free play ; but it is generally in some kind of shelter and never on a bog does it reach heights such as those of the *Osmundas* in Killarney, where you may walk in groves which over-top your head.

The same is true of *Aspleniums*. They do grow on the face of sunny windswept walls, but they do not flourish.

Bracken, except in a few choice forms, few would dare to admit to a limited fernery. Of *Blechnums* I have no right to speak, having experience only of their deaths.

There are many of our *Lastreas*, *Polystichums* and even *Athyriums* which will endure a good deal of exposure ; but you have only to walk along a road running E. and W. and compare the quality of such ferns as may face N. with those on the opposite side which face S., to learn, once for all, the damaging effect of too much sun.

Give shelter from wind and sun is a golden rule for fernists.

In 1920 I wrote for THE GAZETTE (Vol. IV, No. 6, p. 86) an article, the latter part of which dealt with Division, and the dangers of the knife. I had found that *Athyriums* divided easily, *Lastreas* without serious risk, but that *Polystichums* called for special care and skill.

Under Fern Gossip I may include one or two experiences which confirm these conclusions.

Some years ago I found in Co. Donegal what seemed to me a beautiful *A. f.f. inaequale*. This class of variety is now out of favour, and rightly, for many of them might fairly be termed monstrosities, their abnormalities being out of proportion and consequently somewhat grotesque. Not so mine, though the inequalities persist through every part, even the pinnules differing slightly from one another ; the differences are of such a gentle nature that their general effect, instead of being crude, gives an appearance of elegant indentation.

Owing to its position the fern was not easily annexed, but its grace and beauty made labour light.

In pot cultivation my *inaequale* has never rivalled its original beauty, but it has grown well, and latterly it developed into two equally well-formed divisions.

This made the knife necessary. But as each division formed at the top of a root stock about an inch above the surface the successful separation seemed doubtful. The task, however, was undertaken ; the root stock was cut through, the ball, lifted out of the pot, was separated into two sets of roots, the roots were shortened by about one-third of their length, and each division was carefully repotted. Both began unfolding their fronds as if nothing had happened.

Lastreas have been equally kind to me when divided.

But with *Polystichums* it has been different.

I own a specimen of Elworthy's *plumosum*, whose fronds have been praised at Annual Meetings. Four years ago it offered two well-developed and promising divisions ; without disturbing the parent plant I cut away the divisions. Both failed.

With a fine specimen of *P. aculeatum pulcherrimum*, Bevis, I fared nearly as badly. It had some nine closely packed crowns. Realising that nine new plants were unattainable I aimed at six. Three of the six perished.

On the other hand, I have never failed in taking divisions from pot-grown *P. aculeatum gracillimum*. I think the secret is to separate them when young ; a couple of sharp deep cuts will give you the little crown with sufficient roots, without disturbing the parent. The same holds true with the Bevis's *pulcherrimum*. Take your divisions when small ; don't disturb the main plant, whether in the open or in a pot.

H. KINGSMILL MOORE.

FERN EXPERIENCES.

A few numbers ago a short account was given in The Gazette of difficulties experienced with *Asplenium Germanicum* and *A. septentrionale*, and the Editor then advised a moister atmosphere for them ; the room in which they were was particularly dry, and the outdoor frame tried later became overfull of other plants, so a shady and sheltered corner of the open garden was tried, and both ferns have done extremely well in pots standing sometimes in, and sometimes on inverted saucers. Mr. Shirley Hibberd said in one of his books that slugs and woodlice were bad pests of *A. septentrionale*, but so far no trouble of this kind has happened, although some fronds of other species near by have suffered from insect attacks.

It has been noticeable again this year that my crested form of *Cystopteris fragilis* is much stronger in constitution than the normal species, and that its fronds persist later in the season ; it has also been something of a surprise to see a crop of *Polypodium phegopteris* fronds appearing in August, in succession to those produced in early summer. One has learnt, from remarks of the Editor, to expect this in the true (and only real) *Polypody*, but not with the Beech Fern. Perhaps it has been trying to live up to its old name and reputed relationship ! *Lastrea remota* has been very unhappy this year, short and deformed fronds were all that it could produce and at one time a speedy end seemed likely, but a nice crown has developed for next year, before which a rather shadier situation seems advisable. This plant is extra valuable as being, I believe, the last or nearly so of its kind that came from Sale Nursery.

One of the last seedlings raised by Mr. H. Stansfield has now become a sturdy plumose *Athyrium*, less finely developed in size than most because it has always been grown in the open ground and not potted, but very prolific in fronds with nicely imbricate pinnæ. Another plant whose pinnæ are of growing interest is a sporeling of a *Lastrea pseudo-mas* found at Whitewell by Dr. Stansfield, an incised form ; this youngster has pinnules that look most hopefully irregular at the edge, but at present it is only some three inches high. For several years I have been trying to grow *Asplenium Adiantum-nigrum* with no sort of success, and should like to induce (by this note) some successful grower to suggest how to manage this fern. I know a garden where it grows happily in slightly heavy soil, in a narrow border backed by a brick wall. Unfortunately, my efforts to copy this have failed as badly as any others. A good many years ago I tried crossing a "spiral" form of *Scolopendrium* with a crested, although the Editor (I think) has issued warnings against too freakish experiments with *S. vulgare* varieties. However, I cannot claim, or plead guilty to having raised anything too distorted, the results are curious, but by no means hideous, with the fronds in one type split into several tongues at the end, in another the frond forks into two or more parts at the junction of stem and rachis, so that there appear to be two or more fronds on one stem. All the plants are dwarf, but this may be due to their having been raised in an air-tight jar and kept there rather too long. Now, in open ground, they are getting bigger every year.

One of the points that seem, to me, worthy of fuller consideration in fern varieties is the rather curious way in which wild examples appear to be distributed. There are records of some identical or almost identical instances of certain varieties from many far apart localities, whilst other varieties (such as *A. f. f. Victoriae*) have occurred only once and as a single specimen ; some, of course, are barren, but there are many fertile. Are the single instances of these latter the first to show variety ? or are they the sole survivors of a number of sporelings ? or the only sporeling, in each case, that has come to maturity ?

E. A. ELLIOT.

ANOTHER OLD FERN BOOK : THEN AND NOW.

In The Gazette of December, 1920, Mr. S. P. Rowlands has an article on Newman's "Fern Book," Edition 4, 1874. From the quotations Newman seems to have claimed to be the sole repository of the fern lore of the time. He has, he says, many "imitators," but he dismisses their books scornfully by saying about their contents "what is new is not true and what is true is not new." Newman knew nothing of varieties, but he mentions some species under names which puzzle Mr. Rowlands and give rise to an enquiry on his part as to what ferns Newman intended to describe. The answers are supplied, in brackets, by our Editor. They redound to his credit more than to Newman's. Very different is the tone of the old fern book now under notice. My copy is the third edition, published in 1847. But the first edition was published in 1837. Not only was it not an " imitation " of Newman's, but it was written because, as the author, G. W. Francis, F.L.S., tells us in his preface, " the only book ever published upon this subject (Bolton's *Filices Britannicae*) has been long out of print." Taking to himself the guiding principle of Linnæus, " I acknowledge no authority but that of observation," the author works out, in the most systematic and painstaking manner, such results as were available *Then.* The book is enriched by a complete set of plates and woodcuts, whose originals were drawn from specimens of the ferns themselves. The plates show a clearness and delicacy very seldom attained by the photographic processes of to-day. They would be a sure guide, even now, in identifying the plants represented. The woodcuts deal with what the microscope showed in the reproductive organs. As far as they go they seem to me to be of permanent value. But it must be remembered that *Then* the way in which ferns reproduced themselves remained an unsolved problem. Francis gives an interesting account of the tracks pursued by various botanists in their search for the explanation, and he himself would seem to have been on the brink of the discovery when, as the result of his own observation, he wrote as follows about the growth process of spores : " They come up first with a small crown or bud from which soon issues a peculiar shaped frond not unlike that of a lichen, or rather like that of a *Marchantia*, and differing much from the fronds of future growth. When this has expanded to a certain size, according to the species, the centre of it, both below and above, becomes thicker ; the lower part elongates into a root while the upper part assumes a gyrate or circinate form and gradually unfolds itself into an upright frond of the same texture, though much less divided than, those afterwards produced." This interesting set of observations certainly appeared in Francis's second edition, dated 1842, and probably in his first, 1837. The actual discovery of the reproductive action of the prothallus was made by Count Suminski in 1846. What has been written and quoted will probably be sufficient to show that Francis was a careful and successful observer, and that his book marks a definite stage in the study of our native ferns. But the members of our Society are likely to be specially interested in the differences brought out between *Then* and *Now* as to nomenclature and varieties. An exhaustive treatment of these differences would require more space than is available, but notices of the chief differences affecting our chief genera and species will sufficiently illustrate the progress made. Following the order observed by Francis, *Polypodium vulgare* claims first notice. In the glossary given by our Editor in Vol. IV of THE GAZETTE forty varieties are named. Francis mentions only six; he was familiar with *Cambricum* and *bifidum* and three others in the glossary. His sixth would not now count. Such beautiful and well-marked forms as *Cornubiense*, *trichomanoides*, *pulcherrimum*, *omnilacerum* and *semilacerum*, our special Irish form, were pleasures still in the future. *Aspidium* is, with Francis, a very inclusive title. Under it he groups the *Lastreas* and both *Polystichums*. *Lastrea filix-mas* is accompanied by three varieties which Francis thinks definite, and by two others of whose identity he is doubtful. Among the 24 given in the glossary only one of Francis's varieties, *recurva*, appears. He is not aware of the difference between *L. filix-mas* and *L. pseudo-mas*, which has 18 varieties in the glossary. Though the difference between *Then* and *Now* is marked everywhere there is no species where it is more noticeable than in what are now known as the *Polystichums*. With us Francis gives them, in English, the title "Shield Ferns," but following the botanists of his time, he divides our *P. aculeatum* into two species, *Aspidium lobatum* and *A. aculeatum*, while he only mentions *angulare* as a variety of *aculeatum*. It is generally agreed by modern botanists that the *Aspidium lobatum* of Swartz, Gray and Willdenow is merely a stunted or immature state of *aculeatum* while *angulare* is usually recognized as a species although there are undoubtedly connecting links which make it sometimes difficult to draw the line between the two. In connection with our *P. angulare* he mentions two varieties which he considers "well marked." Neither occurs among the 117 in the glossary. How his eyes would have sparkled could he have entered one of our modern ferneries and witnessed the bewildering richness and beauty that wise selection and careful cultivation have given to the *Polystichums* of to-day. We must notice the differences between *Then* and *Now* in the section to-day termed *Athyrium filix-foemina.* Francis puts our Lady Fern (he uses this title) under *Aspleniums* as *Asplenium filix-foemina.* He mentions three varieties. None of them appears in the glossary's list of 74 ; two of them would not be considered varieties *Now.*

Finally, we take *Scolopendrium vulgare* : Francis knew *crispum* and *lineare* ; he also gives *multifidum*, a title not included in the glossary. Three varieties—*Then.* The glossary names one hundred and twenty. Summing up the advances from 1847 to our own time, as between Francis and the glossary we find, in the classes examined, Francis has a total of 20 varieties, the glossary has 410. This, however, gives an inadequate idea of the advances for two reasons. Every year the list of varieties grows as is shown by the awards made at the Annual Meetings ; and, what is more to the point, the glossary is merely an explanation and translation of Latin or other titles. It is in no sense a complete *list* of varieties. Often under a single title would come a formidable array of differing varieties. Take a single illustration : *Divisilobum* counts as one in the list of *Polystichum angulare*, but it is doubtful whether even our Editor would venture to say how many *Divisilobes* are now known. New forms are always coming, at least half a dozen have been distinguished among my own seedlings. *Divisilobes* alone would score a century or more. The same is true of many other forms, which in the glossary get only a single mark ; so that while the enumeration of varieties needed only two figures in Francis's time, they would now certainly require four.

If we go on to make brief enquiry into this so great difference between *Then* and *Now*, the explanation may, I think, be mainly found in mistaken prejudice. The older botanists looked on varieties as mere freaks or "sports," here to-day, gone to-morrow, of little permanence, and no outlook. Francis, so meticulously careful in his examination of genera and species, has remarks of quite a superficial nature about the untrustworthiness of such variation as he had seen in *Scolopendriums*.

Once, however, the secrets of the prothallus were fathomed, rapid expansion ensued. Success in cultivating from spores resulted in the long array of most lovely forms which now adorn our ferneries.

This alone is enough to make varieties of permanent and undying interest. But their study has revealed another feature, one of special value for the botanist. At the very core of botany lies the study of the life history of plants. From varieties botanists have learned that, while the prothallus is the normal medium for fern reproduction, there are various other ways such as "apospory," discovered by our late President, Chas. T. Druery, V.M.H., whereby new forms have been raised.

The older botanists, such as Francis, by their minute studies of genera and species, leading up to the discovery of the functions of the prothallus, laid a sure foundation upon which are built the glories of the present edifice.

H. KINGSMILL MOORE, D.D., F.L.S.

ADIANTUM CAPILLUS-VENERIS L. IN GLAMORGANSHIRE.

While spending a holiday this year in South Wales, I was glad to have the opportunity once again of seeing our British Maidenhair in its natural haunts. It was some thirty years previously that this site had been visited, and it was good to note that the plant had at least held its own during that time.

I also had the pleasure of discussing this rare and interesting species with Prof. A. H. Trow, D.Sc., to whose edition of the Flora of Glamorgan I am indebted for much of the following information.

One of the earliest references to this rare little fern is that of Edward Llwyd, who, in 1689, speaks of it as "growing plentifully out of a marly incrustation, both at Barry Island and at Porth Kerig, and out of no other matter." Edward Newman (1844) quotes Dillwyn as stating that it was common on the cliffs of lias at the Eastern end of the county, but that he had not seen it on mountain limestone, or nearer to Swansea than Dunraven. Newman himself had seen specimens from Barry Island and states that "this as well as Port Kerig have been given in all our Floras as localities."

The species originally ranged from Penarth on the East to Dunraven on the West. It is, as Dr. Trow points out, strictly confined to the coast, and almost, but not quite, to the peculiar habitat noticed two hundred years previously by Llwyd. It grows chiefly on the cliff face, on rocks that always seem to be damp or even wet, and which are encrusted by calcareous deposits. The plants naturally prefer chinks or deep pockets that are sheltered from wind and sun. The main masses of the fern grow high up, out of reach, on the cliff and seem to be for ever safe from the over-enthusiastic collector, but a search in suitable places along the base of the cliffs will reveal plenty of sporelings and even older plants of a fair size. Most of these small plants occupy chinks, embedded in mats of a small growing moss—a species of *Weisia* which favours damp calcareous places. A few plants stray into clays and shales between limestones in the immediate vicinity, but never far from the sea, and are then always protected by grass or other vegetation. Owing to the exposed situation, the plants never develop fronds which compare in luxuriance with those seen in cultivated specimens, but even after this dry summer, those plants which were growing in a favourable situation were in excellent condition.

This fern no longer grows at Penarth, and on Barry Island it is generally thought to be extinct, though it may linger in some inaccessible spot. It may also, of course, be re-introduced there at any time by wind-borne spores from a neighbouring site. Dr. Trow visited Barry Island this year and searched for the plant, but found that while the original tufa was still in situ in places, all was quite dried up and no trace of the fern was to be seen.

The main station at present seems to be immediately to the West of Fontigary Bay. The plants extend, in considerable numbers, along the lias cliffs for half a mile Westwards. The cliffs then become too dry for any moisture-loving plants, and no further specimens are seen. The fern reappears, however, in one or two places in the direction of Dunraven where the essential factors of moisture and shelter are found.

While the Maidenhair has held its place for many years as a native species, it is essentially a plant of warmer climates than our own. It cannot be looked upon as a hardy plant, and for its survival in the open, it demands certain special conditions. Dr. Trow's comments on this point are of great interest. He notes that while severe frosts are rare on the South Glamorgan coast, the winter cold is sufficient regularly to destroy the fronds. The rootstocks alone survive and may be protected from excessive cold by the constant flow of water from weak springs in the rocks. In exceptional winters, the first formed covering of ice may even save the rhizomes from the further effects of bad weather. It seemed to me, too, that the moss in which so many plants were embedded might have some slight protective function. The constant supply of moisture oozing from the rocks is, of course, of considerable importance to the plants during the period of growth, but Dr. Trow is of the opinion that the temperature is a more critical factor than the water supply in guaranteeing the persistent survival of this delicate species on the Glamorgan coast, and suggests that further experiments and observations are needed. The high calcareous content of the cliff water will doubtless affect its freezing point. In any case, the Maidenhair supplies another interesting example of a fern which in nature grows in a limy soil, but which under cultivation grows well in soil of a peaty or acid nature.

It would be of considerable interest if someone familiar with this plant in other British localities would supply a few ecological notes. Soil, aspect, water supply and winter temperature are the important points, and a comparative study might throw some valuable light on the factors essential for the welfare of this pretty little species in our country. Specimens have been found as far North as the Westmorland coast, and plants from this locality might prove to have a more hardy constitution than those from more favoured habitats.

S. P. ROWLANDS.

FERN-HUNTING ON THE VOSGES MOUNTAINS.

October 16th, 1934.

Dear Dr. Stansfield,

Seeing how generously you have mentioned my correspondence in the last number of THE GAZETTE I feel encouraged to write you about my fern experiences of this year.

I write you from Alsace, where I have an old family house at the foot of the Jura Mountains.

The Alsatian Jura is very poor in ferns, being too dry. But I have again been with my friend, Mr. Emile Walter, from Saverne, in the beautiful South Alsatian forest in the Vosges Mountains.

This year it was with the object of hunting for *Hymenophyllum Tunbridgense.* In the Vosges, *Hymenophyllum* has so far only been found on a single boulder of red sandstone in a valley in the region of the Donon. The discovery was made during the war by Mr. W. G. Hanschke, chemist, at the time serving as a German soldier. A good botanist he certainly is, as the fern is particularly minute there and its fronds are hidden by the mosses among which it grows and against which it has to fight. Although the place is not a "paradise of ferns" as are many other valleys near, it is certainly a great paradise of mosses, the finest I have seen. After the war Mr. Walter was able, in 1923, to rediscover the station. Nobody had been there in the meantime and as the place had changed owing to road-cutting, we had to search carefully many moss-covered boulders before Mr. Walter hit on the true one, and when he suddenly handed me a bit of moss it took me some time, with my old eyes, to detect the moss-hidden *Hymenophyllum*. I certainly should have passed that boulder a hundred times without noticing the fern. Mr. Walter says the surface covered by it is greater than at the time of his first visit eleven years ago. At present it covers about six square feet. This is, so far, I believe, the furthest inland station of *Hymenophyllum* on the continent of Europe. The altitude is about 2,000 feet. Mr. Walter says that in February, 1929, the temperature at this spot can be estimated as having sunk as low as —29° or —13° C. This is a further proof of the hardiness of *Hymenophyllum*. The rainfall is great—estimated at about 60 inches a year.

The commonest fern there is *Dryopteris dilatata* growing, not only on the soil, but also as very frequently in the Northern Vosges, on vertical sandstone surfaces ; of course they are stunted, and often in colonies. From a distance one would take them to be colonies of *Polypodium vulgare*.

We did not see any *Dryopteris spinulosa*, which frequents lesser altitudes.

Dryopteris montana was frequent.

Athyrium f.f. and *Dryopteris filix-mas* a little less so.

Dryopteris paleacea was present and *Blechnum spicant* frequent quite near the *Hymenophyllum* station.

We found a good colony of *Lycopodium annotinum*, and *Lycopodium Selago* was seen also.

Dryopteris paleacea is, there, a smaller fern than *filix-mas*. I have seen no specimen much above 2 feet, whereas those I saw in Northern Italy last year were about double the height. This is really a southern fern which, however, reaches as far north as the Vosges and the Black Forest, and then, of course, England, like other Southerners. In Switzerland I have only seen ferns that are a distant approach to *paleacea* (of course I except the Tessin, south of the Alps, which, although belonging to Switzerland, has a North Italian flora). But a kind correspondent from near Zurich has promised to send me what he considers a real *paleacea* from there and also a hybrid *paleacea* × *dilatata*, which I am hoping to compare with the hybrid *filix-mas* × *dilatata* after having planted them side by side.

In our trip we did not find this hybrid, *filix-mas* × *dilatata*, which is so plentiful in the Vosgian forest near the Hohwald where we collected it last year. Growing this fern in the garden near the hybrid *spinulosa* × *filix-mas*, it is quite distinct, although when dried up in the herbarium the two hybrids look very much alike and have so far been united by botanists under the name of *Dryopteris remota*. The *dilatata* hybrid is a larger fern and its fronds are elongated deltoid, the first pinnæ from the bottom being generally the longest. When young, and especially while growing, the fronds are of a yellowish green, in contrast with the dull green of the *spinulosa* hybrid. The *dilatata* hybrid is quite fertile and reproduces itself freely from spores, differing in this respect from the *spinulosa* hybrid. It has been named by Borbasio *Dryopteris subalpina*. No doubt this hybrid exists also in England, but is probably confused with the other under the general name of *Dryopteris remota*.

Near Saverne we visited the botanic garden which Mr. Walter has founded there under the patronage of the Vosgian Club. Although only a few years old, it is marvellous how Mr. Walter, aided by devoted local botanists, has created wonders there in so short a time. The garden is on a slope on the main route from Paris to Saverne, on the place called Col de Saverne (Saverne Pass). It overlooks the town and the Alsatian Plain.

The garden has a considerable area of outcropping boulders and flat sandstone, so that rock garden sections were comparatively easy to create. It has full sunshine in places and shade in others, provided by tall trees, and what is specially valuable, and made Mr. Walter choose the spot, is that, whilst most of its surface is absolutely lime-free, there is also a great portion where lime is present.

Of course, a collection of ferns was soon started. The common ferns already existed in the wooded portion and on the rocks. The collection is already very interesting in the matter of hybrids. Mr. Walter, this year, added both the hybrids of *Polystichum angulare* and of *Polystichum aculeatum* with *P. Braunii*, which he found in the Pyrenees near Luchon where *Braunii* has an abundant station intermingled with its cousins.

Passing through Strasbourg I visited the University botanic garden. I found that the labels of ferns are intermixed (and confused) there and a pteridologist is badly wanted as in so many other gardens. What struck me there is the abundant growth of *Adiantum cap.-Veneris* outside the walls of the central hot-house. Of course, this occasional occurrence of the Maidenhair fern on the outer walls of greenhouses is well known and occurs in England as recorded in The Gazette, but Strasbourg has a colder winter climate than any place in England. It proves that the hot-house in Strasbourg is generously heated so that the walls radiate enough heat to protect the rhizomes which stick closely to the bricks. In the Strasbourg botanic garden I had the luck to be able to collect spores from *Dryopteris Africana* (of the *Phegopteris* section, alias *Polypodium*) which is one of the latest additions to the list of European ferns. Mr. Walter, during a recent visit to Northern Spain, had collected this fern and had left it in the care of the head gardener, there being no proof that the species is hardy. *D. Africana* is the third addition to the European fern flora found in Spain since the beginning of the century and possibly not the last. I had been unable, so far, to obtain spores of this fern. Now, if I should succeed with my sowing, my collection of European ferns will be nearly complete. Those still lacking are from the Caucasus, where botanizing is probably not easy at present.

At the end of this month I intend going to Brissago on Lago Maggiore with the hope to find the hybrid (possibly *Asplenium refractum*) mentioned in the last number of The Gazette and, if luck favour me, spores will be sent to anyone wishing to try to raise the fern.

I have a valuable addition to my collection of polypodies, a very beautiful plumose *P. v. trichomanoides*, which I have obtained among seedlings of *P. v. Cornubiense* from a sowing made five years ago. It is therefore an English fern. Last year it was already very distinct, though small, but this year it has developed its qualities. It is a very slender form which probably never will grow to any great size, but it develops fronds profusely. These, however, are not all equally divided and equally plumose, but the fern will probably further improve with age. It is, of course, entirely barren. I shall try to obtain a good photograph for another number of THE GAZETTE. In the meanwhile, I thought it as well to mention this success in the hope to induce others to sow *P. v. Cornubiense*, which probably can " sport " also in other directions. I shall be pleased to send spores of *Cornubiense*, as soon as ripe, to anyone interested. I have not been able, so far, to obtain spores from the slender and more divided form of *Cornubiense*, viz., *P. v. trichomanoides*, which produces bulbils in the sori instead of sporangia (so also does *Cornubiense*, but to a lesser extent). I try every year to grow ferns from these bulbils, but, so far, without success. This year I have two bulbils which have each given one frondlet. Probably they will die during the winter as has hitherto been my experience. I shall be glad to know if anyone has had success in this direction.

Going back to your quotation from my letter in the last issue of THE GAZETTE, I had forgotten to mention that I had also two plants of *Scolopendrium hybridum* doing well in the garden on a wall (protected in winter) where I had planted them last year. The bulbils on the plant which died in the greenhouse did not take root.

Asplenium Foreziacum may have originated by hybridization of *fontanum* and *lanceolatum*, but it has not, to-day, the character of a hybrid, being extremely fertile with none but normal spores. Besides, most of its stations are in districts where it grows far away from either *fontanum* or *lanceolatum*.

Anyhow, this year I shall send you *Foreziacum* from Brissago and you will be able to try to hybridize it with *trichomanes*, which will save you from the probable non-success in the first step suggested by you, viz., hybridizing *fontanum* and *lanceolatum*.

I find *Foreziacum* quite as hardy as *fontanum*, though one of the most difficult ferns to grow ; the more so as it is one of the ferns slugs and snails feast upon with voracity in preference to anything else. I can only grow it protected by wire gauze.

It is surprising *Foreziacum* has never been found in England. It has now been found in many places on the Continent, where it formerly was mistaken for *fontanum* which this very polymorphic fern mostly resembles. If at any time a fern looking like *fontanum* is found on granite or other rock free of lime, closer inspection will show it to be *Foreziacum*. It would be interesting to know on what kind of rock *fontanum* has been found in England, where I understand it is now extinct and to examine the specimens in herbaria if there are any.

Yours sincerely,
PAUL KESTNER.

MR. CRANFIELD'S EXHIBIT OF FERNS AT THE R.H.S.

At the Fortnightly Meeting and Show of the R.H.S. in the New Hall at Vincent Square, on November 6th, 1934, Mr. W. B. Cranfield put up a group of varieties of *Phyllitis Scolopendrium* effectively arranged. The exhibit occupied a prominent position and provided a restful patch of graceful forms and fresh green colour in the hall, which was mostly filled with brightly coloured flowers and rich autumnal foliage. The group included many of the best forms of *Scolopendrium crispum*, such as *grande*, Wills ; *speciosum*, Moly (this with a number of variants the result of bud " sports " raised from frond bases) ; *splendens*, Moly ; *nobile*, Bolton ; *robustum*, Jones ; *crispum*, Mrs. Stabler ; *fimbriatum* and *fimbriato-cristatum* ; *variegatum*, Bolton ; *Drummondiae* ; *majus*, Moses ; *muricatum*, Lowe ; *sagittato-crispum*, Wollaston. There were also representatives of most of the other sections such as *peraferens*, *radiosorum* and *cornutum* ; *sagittato-cristatum*, Druery ; *projectum*, Moly ; and *sagittato-projectum*, Moly ;

supralineatum, *marginatum*, and many other forms. The whole formed a striking, but to some visitors perhaps bewildering, demonstration of what a single plain-fronded species can do in the way of variation and decoration Mr. Cranfield was awarded the Society's Banksian Medal for the group—not too great a reward for an exhibit put up, not for any pecuniary consideration but simply to demonstrate the capabilities of one of our native species of ferns. Our President also received the R.H.S. "Award of Merit" for *P. Scolopendrium crispum splendens*, Moly, which was in a separate category. A Dinner of the Horticultural Club was held in the evening, followed by a lecture from the Marquis of Headfort on some of the discoveries of floral discoveries of George Forrest in China and Thibet, over both of which Mr. Cranfield presided.

THE ANNUAL MEETING AND ITS LOCALITY.

The settlement of this question annually is a matter which presents some difficulty on account of the scattered character of our membership. No doubt each and every member has an equal right to have a voice in the matter but, as the number attending each meeting is often a very small proportion of the whole membership, it is impossible to please everyone and for the last two or three years the Annual Meeting has deputed the duty of fixing the place of the next one to the General Committee. This is a fairer method than the former one as the Committee is not only representative but its members are fairly distributed over the British Isles. The place, however, involves considerable correspondence as it is impossible to get a full meeting even of the Committee. The Hon. Secretary will be glad to receive suggestions from any members of the Society and all these will be duly considered by the Committee, so that, as far as possible, the whole of the members who wish it shall have a voice in the selection. As soon as the place of meeting has been decided the whole of the members will be notified by circular so that arrangements for attending may be made in good time.

F. W. STANSFIELD,

Hon. Secretary.

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SHERRIN, W. R., A.L.S., South London Botanical Institute, 323, Norwood Road, London, S.E.24.
SINCLAIR, JAMES A., 57, Stradella Road, Herne Hill, London, S.E.24.
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SMITHERS, Major A., Morleys, Great Hallingbury, Essex.
STANSFIELD, F. W., M.D., F.L.S., 120, Oxford Road, Reading, Berks.
STANSFIELD, TOM, M.B., B.S., 120, Oxford Road, Reading, Berks.
STEPHENS, G. E., 36, Bedford Road, Horsham, Sussex.
STEPHENS, EDWARD J., Rose Lawn, Digswell, Welwyn, Herts.
STEPHENS, MICHAEL, Coverwood, Ewhurst, Surrey.
STINCHCOMBE, H., 92, Dunbar Avenue, Foleshill, Coventry.
SUDELL, RICHARD, F.I.L.A., A.R.H.S., 4, Bedford Square, London, W.C.1.

TAYLOR, Mrs. JAMES, Colomendy, Mold, N. Wales.
THORRINGTON, F. W., Sunnymead, Little Baddow, near Chelmsford, Essex.
TROTTER, P. D., Leith Vale, Ockley, Surrey.

WAKEHURST OF ARDINGLY, The Right Hon. G. W. E. LODER, Baron, M.A., F.L.S., etc., Wakehurst Place, Ardingly, Sussex.
WALKER, W. B., Cook's Hollow, Enfield, Middlesex.
WARREN, JAMES, Flat 2, 13, Bruton Street, London, W.1.
WATERHOUSE, ALFRED, East View, Warton, Carnforth, Lancs.
WEISS, Professor F. E., F.R.S., F.L.S., Easedale, Woodway, Merrow, near Guildford.
WESTLEY, EDWIN, 2685, Nina Street, Lamanda Park, Pasadena, California, U.S.A.
WHITESIDE, R., 51, Borrowdale Road, Lancaster.
WILLIAMS, J. C. (Lord Lieutenant of Cornwall), Caerhays Castle, Gorran R.S.O., Cornwall.
WIPER, ERNEST, 726½, Yates Street, Victoria, B.C., Canada.
WOOD & SON, F.R.H.S., Nurseries, Taplow, Bucks.
WOODCOCK (His Honour Judge) H. DRYSDALE, K.C., Lypiatt Park, Stroud, Glos.
WYNCH, Mrs. VIOLET A., F.R.H.S., Pine Hill, Camberley, Surrey.

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

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June, 1935.

EDITED BY

F. W. STANSFIELD, M.D., F.L.S.

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President : Mr. W. B. Cranfield, F.R.H.S., F.L.S., East Lodge, Enfield Chase, Middlesex.

Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, F.L.S., "Monkhams," Lower Road, Great Bookham, Surrey.

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THE
BRITISH FERN GAZETTE.

NEW SERIES

Vol. VI. JUNE, 1935. No. 12

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OUR FRONTISPIECE.

Polystichum angulare elegantissimum, F.W.S.

This is one of the best of the many *pulcherrimum* seedlings which have been raised from *P. ang. divisilobum plumosum foliosum*, H.S. It came in a batch sown in 1928 and has not yet reached full maturity but it shows plenty of character and seems to be of a particularly refined type although, so far, it is a fairly good grower. The tips of the ultimate segments all have the characteristic curly aposporous appearance, but no attempt has yet been made to raise offspring by this means.

JUL 18 1935

EDITORIAL NOTES.

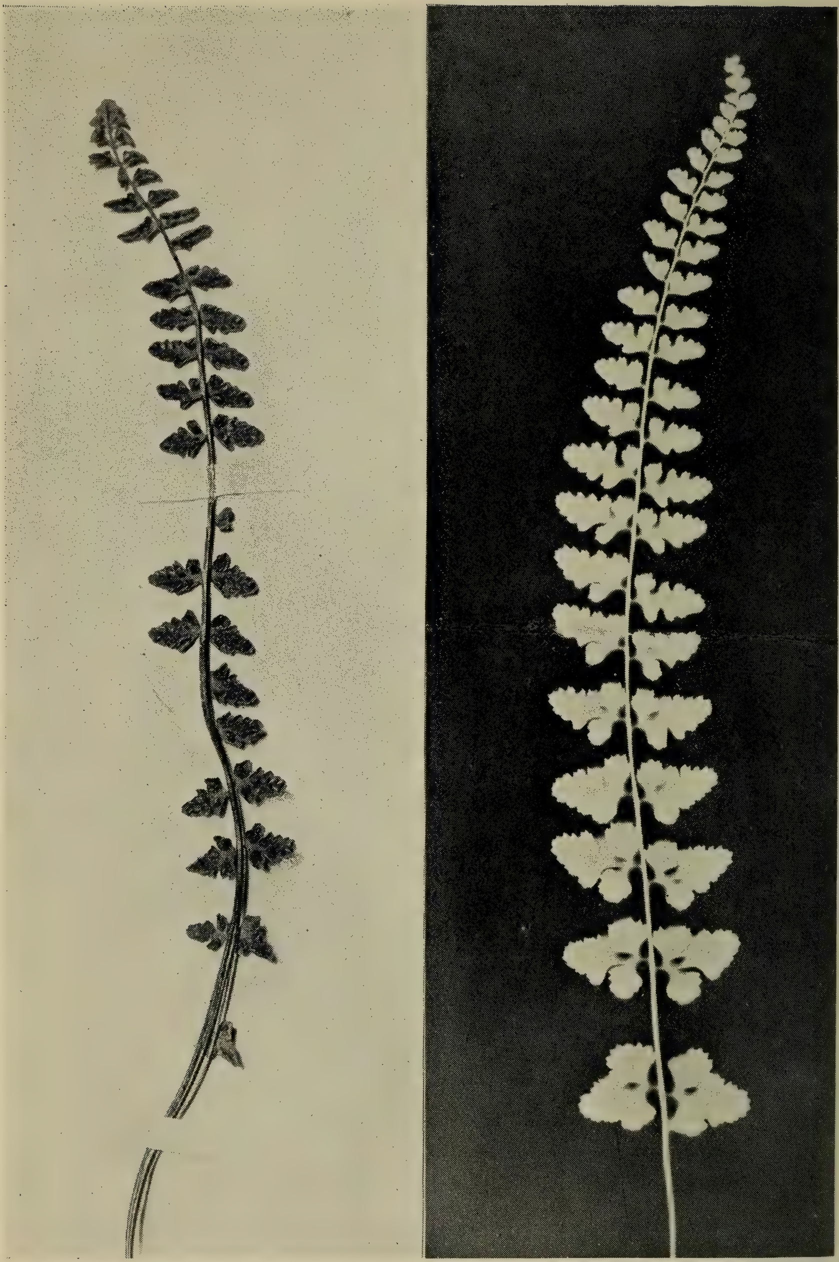
We have received from M. Kestner a living plant of *Lastrea subalpina*, otherwise *Nephrodium subalpinum*, Borbasio. It has a considerable resemblance to "*L. dilatata Boydii*," though there are differences between the two which we hope to study carefully when the two plants are more fully developed. At present the only noticeable differences are that *Boydii* has a more scaly stipes and rachis and is slightly thicker in texture than the other. We shall not be surprised if *Boydii* should turn out, as has been suggested, to be *dilatata* × *paleacea* instead of *dilatata* × *filix-mas*. Professor Bower has suggested that a decisive test might be found in a cytological examination and a comparison of the number of chromosomes between the hybrid and the supposed parent species. Unfortunately the cytological experts we have consulted think that such a comparison would be difficult, if not impossible, on account of the extremely numerous chromosomes in these species and the consequent technical obstacles in the way of such an examination. We hope that the examination of the characters of the seedlings now being raised from *Boydii* may throw some light on the subject.

The Botanical Department of the University of Geneva has applied to purchase copies of all the back numbers of our GAZETTE. These have been supplied as far as possible, though unfortunately several numbers of the earlier volumes were not available, being out of print. We shall continue to send THE GAZETTE to the Swiss University in future as the numbers are issued.

OBITUARY.

HANBURY.

We read with regret of the death on March 20th of Reginald Janson Hanbury, M.R.C.S., L.R.C.P., the second son of our Vice-President, Mr. Frederick J. Hanbury. Mr. Hanbury



No. 1. No. 2.

Asplenium Foresiense × trichomanes.

No. 1. Frond from plant as found wild.

No. 2. Frond from same plant after cultivation.

was a director in the firm of Allen & Hanbury's, Limited, since 1912. He was also a Governor of St. Bartholomew's Hospital and a member of the British Medical Association. Our sympathies will go out to his father, our venerable Vice-President, and also to the widow and children of the deceased gentleman.

ASPLENIUM FORESIENSE, LE GRAND, AND ITS HYBRID WITH TRICHOMANES.

We have received from Dr. Becherer, of Geneva, a short account of the synonymy of *A. Foresiense*, from which it appears that that fern was first described, *as a species*, in "La Revue de Botanique" by Rupin in 1894. It had previously been described as a variety, viz., as *A. Hallerii* var. *Foresiacum*, Le Grand, in 1869, and as *A. Hallerii* var. *Foresiense*, Le Grand, in 1873. According to the botanical rules in force at the Cambridge and Vienna conferences, therefore, Rupin's name of *Foresiense* (species) is the only valid one and must be accepted as correct. It is significant also that *Foresiense* has also been referred to, in a catalogue of plants in 1884, as "*A. refractum*, Rupin (non Moore)." It seems probable that this is what has led to the *Foresiense* hybrid being confused with the *refractum* of Moore with which it has really no connection.

Referring now to the hybrid of which (as briefly noted in THE GAZETTE, Vol. VI, No. 11, p. 273), M. Kestner sent us a frond from the neighbourhood of Brissago in S. Switzerland, we now print a reproduction of a photograph of this frond which was collected by M. Kestner from a dry wall in a hot situation. As will be seen it has a strong resemblance to *A. trichomanes* and might well be taken for a form of that species. M. Kestner, however, collected the plant alive for cultivation and, under his care, it has since produced fronds of a very different appearance, one of which we print and which resembles a subconfluent form of *A. Foresiense.*

When it is realised that the two fronds are from *the same plant* it will, we think, be admitted that they constitute convincing testimony to the hybrid origin of the fern. It is regrettable that the plant, which was formerly found in some quantity, has been so nearly exterminated, since those previously collected have been presumably dried as herbarium specimens and, however interesting these may be as curiosities, they contribute little or nothing to the life history of the fern. M. Kestner's plant, however, is in a different category. As a living plant its behaviour can be examined, it is hoped, over a long period ; spores can be sown and the resulting seedlings, if any, can be compared with the parents and with each other, as well as with any specimens or figures of *A. refractum*, Moore, which this hybrid was reported to resemble. The present writer is still of opinion that this hybrid is *not* Moore's *refractum*, which remains as great a mystery as ever. We have sown scrapings from the frond sent to us but, so far, no prothallia have resulted. This, however, is not surprising, since the sporangia were, apparently, all empty though the cases were well developed. It is quite possible that future sowings from M. Kestner's cultivated plant may be more successful and, in any case, the fern itself remains alive for biological study. Also it may be possible to re-raise the hybrid by sowing together the spores of the two parents.

* Since the above was written M. Kestner has sent us a photograph of a seedling which has appeared among his own sowings of *Foresiense* and *trichomanes* and which seems likely to be similar to, if not identical with, the wild-found Brissago hybrid.

F.W.S.

LETTER FROM DR. DE TAVEL *RE* HYBRID LASTREAS.

We have received a most interesting letter from our new member, Dr. de Tavel, of Bern, and as the contents are of botanical importance we venture to reproduce it almost at length :—

" Dear Dr. Stansfield,

I duly received your kind letter of December 17th, and beg to apologise for not having answered earlier.

M. Kestner sent me the superb frond of *Lastrea dilatata Boydii* he had received from you and we studied it together. There can be no doubt that it is a hybrid between *Lastrea filix-mas* and *L. dilatata.*

There are four hybrids which are hardly distinguishable when dried in the herbarium and deserve close study by cultivation. They are :—

Lastrea filix-mas × *spinulosa* (*remota*).
,, *filix-mas* × *dilatata* (*subalpina*).
,, *paleacea*, Moore (*Borreri*, Newman, *pseudo-mas*, Woll) × *spinulosa.*
,, *paleacea* × *dilatata.*

It is possible that two more may be found, namely, *L. propinqua* × *spinulosa* and *L. propinqua* × *dilatata*, which seem not yet to have been observed.

By the way, the name of *paleacea*, Moore, is by recent authors confined to some tropical ferns from Mexico, South America and Hawaii. Our native form, which occurs in the South of Europe, Madeira and the Canary Islands, is now called *Lastrea Borreri*, Newman, this name being older than the *pseudo-mas* of Wollaston.

As on the one hand it is not always easy to distinguish *L. filix-mas* and *L. Borreri*, and on the other hand *dilatata* and *spinulosa*, it is much more difficult to distinguish their hybrids. By the crossing their characteristics are effaced, and in dried specimens it is impossible to determine them with any certainty. Perhaps reliable biological marks of distinction may be found by cultivation. In a paper by Mr.

G. B. Wollaston about the division of *Lastrea filix-mas* into three distinct species (THE BRITISH FERN GAZETTE, Vol. III, No. 25, September, 1915), the author refers also to biological characteristics. Such ones may also be helpful in the distinction of the above-named hybrids.

A friend of mine, a clever observer and pteridologist, believes he has found in Switzerland, in the neighbourhood of the lake of Zurich, *Lastrea Borreri* × *dilatata.* By cultivation he stated that this hybrid differs from *Lastrea subalpina*, Borbasio, by

(1) a special lustre of the surface of the frond which is also characteristic for *Lastrea Borreri* and similar to that of *Polystichum aculeatum* and *lonchitis* ;

(2) their shooting forth in spring a month later than the fronds of *filix-mas* and *dilatata*, like those of *Borreri.*

(3) evergreen or sub-evergreen fronds which remain upright in winter like those of *L. Borreri*, if they are not squeezed by too heavy a load of snow.

In certain cases it may be possible to determine hybrid findlings by stating what ferns grow or do not grow in their surroundings and come into consideration as possible parents. It is in this way that Mr. Fornin was able to state the occurrence of *L. Borreri* × *dilatata* in certain stations of the Caucasus, and my friend as mentioned above in certain woods on the borders of the lake of Zurich. But conclusions must be drawn very cautiously.

In the case of *Lastrea Boydii* M. Kestner and myself are struck by its dense paleaceous attire. This seems to reveal a descent from *Lastrea Borreri.* As you are growing the plant you will be able to decide yourself whether it agrees with the above-named three characteristics of true *L. Borreri* × *dilatata.* If it is so, it cannot be named *L. subalpina*, Borbasio. In this case I should propose to call it *L. elata Boydii*, as my friend and myself decided to give the name "elata" to our Swiss *Borreri* × *dilatata*, while we reserve the name *L. nitens* for *L. Borreri* × *spinulosa*, if our supposition of the occurrence of such a hybrid should be proved true.

I am, dear Sir,
Yours sincerely,
F. DE TAVEL.

RECORDS OF OTHER FINDS OF ASPLENIUM VIRIDE PLUMOSUM.

We learn from M. Kestner that another plumose form of *Asplenium viride* has been found in Switzerland by M. Oberholzer of Samstagern, a good pteridologist, who has left it undisturbed for the present. It is suggested that the fern should be photographed and we hope some time to be able at least to compare the photograph with that of Mr. Greenfield's find. We understand that Dr. de Tavel has seen the plant. *A later letter from Dr. de Tavel informs us that at least four plumose forms of *viride* have been found on the continent by French and Swiss botanists and we copy the following details from his letter :—

"Yes, my friend M. Oberholzer found last year two plants of this *Asplenium* on a piece of rock in the Sohlsprung, a gorge of the Sohl river, not far from Zurich. By inattention he uprooted one plant but planted it carefully in a pot, where I saw it last autumn. He writes me that it is still alive but rather poorly and produced this spring some small new fronds. He hopes to get it through by keeping it under glass. He has not yet been able to examine the other plant which last year he left in its place, the vegetation being much retarded. In our country the ferns suffered, this spring, much from frost.

Another *A. viride plumosum* was found in August, 1922, by M. G. Beauverd and M. Ph. de Palézieux (both well-known botanists of Geneva) in France, in the surroundings of the lake of Annecy on the range of La Tournette, near the hamlet Serraval, on a rock at an altitude of about 5,700 feet, in company with typical *A. viride* and *Cystopteris fragilis*. M. Beauverd published a description of it (Bulletin, Soc. Botanique de Geneve, 2me serie, Vol. 14, 1923) under the name *Asplenium viride* var. *Serravalense.* I saw twelve dried fronds of it ; it is the same fern as figured in THE GAZETTE, but not quite so luxuriant, a little smaller, more compact, yellow-green, but not less divided than your plant.

In October, 1924, M. D. Coguoz in Marécottes (Valais) found another plant of *A. viride plumosum* at an altitude of 1,660 metres, on the debris of a moist slope near Salvan in Valais (on the South side of the famous Dent du Midi). It is exactly the same fern as that from La Tournette, yellow-green, well developed and much divided. Two fronds of still another somewhat different form were sent me in the spring of 1922. It was also found in Switzerland on a piece of "Nagelfluh" rock in a beech forest in the Canton of Aargau. It differs from the other "plumosums" by its pinnæ being more or less elongated and acuminate. In form they are very similar (although even more elongated) to Fig. 548 of *A. trichomanes incisum* by E. J. Lowe, *Our Native Ferns*, Vol. II, p. 199.

All the fronds I have seen from these various places are absolutely barren. It is a puzzle to me how the same variety could repeatedly come into existence in such far distant places. In the Zurich station, however, there seem to be intermediate forms between *plumosum* and *A. viride incisum* (or rather *viride crenatum*, Clapham).

M. Oberholzer is carefully observing the further development of these ferns.

With regard to the name "*plumosum*," I wonder whether it is not the same fern mentioned in literature as var.

bipinnatum, Clowes. The remark 'pinnæ deeply incised in the manner of *A. trichomanes incisum*' makes me believe that the plant of Clowes was identical with our *A. viride plumosum*. Is there nowhere a dried frond of it in a herbarium which would enable us to make this clear ?

Believe me, dear Sir,
Yours sincerely,
F. DE TAVEL."

(Cf. GAZETTE, Vol. VI, No. 5, p. 129.—Ed.)

There is, of course, no reason why multiple plants of a plumose form of *viride* should not occur in a region where the species is abundant and widely spread just as numerous finds have been made of *A. trichomanes incisum* in this country, as also of *Scolopendrium v. crispum* and *Polypodium v. Cambricum*, all of which are sterile plumose varieties. In this country, so far as is known, only one plumose *viride* has been found, viz., the so-called *bipinnatum* of Clowes, found by J. Huddart on Whitbarrow in 1853, but it is possible that some of the "*incisums*" which have been found may have been of this character, though all I have seen have been merely serrate and not plumose. The name *bipinnatum* as applied to Huddart's find appears to be a misnomer if the description in Lowe's book is correct. Unfortunately no frond, figure or sketch of this fern is known to exist and there is probably no one now living who ever saw it.

F.W.S.

"NATURAL HISTORY OF THE HITCHIN REGION."

We have received a copy of the "Natural History of the Hitchin Region," referred to in THE GAZETTE, Vol. VI, No. 11, p. 278. It represents the results of the efforts of a considerable number of workers during many years, the editor being Mr. Reginald L. Hine, F.S.A., and the principal contributors being Mr. E. F. D. Bloom, M.A., B.Sc., Miss G. B. Howells, F.R.G.S., Mr. J. E. Little, M.A., Mr. Ray Palmer, F.R.E.S., F.Z.S., Mr. A. H. Foster, F.R.E.S., M.B.O.U., Mr. F. W. Edwards, M.A., Sc.D., and Mr. W. H. Lane. The names of many other workers are mentioned in the body of the work, including our Vice-President, Mr. T. B. Blow, F.L.S., and several members of the Ransom family, two of whom are members of our Society.

Twenty-five pages are devoted to an historical introduction, 27 to Geology, 3 to Meteorology, 76 to Botany, 158 to Zoology and 16 to Archæology, making a totality of 257 pages of reading matter. Mr. Blow was one of the original members of the Hitchin Natural History Club (formed in 1879) and published, in the *Hertfordshire Express* of 1880, a series of articles entitled " Outlines of a Flora of the neighbourhood of Hitchin," and his records were incorporated in Pryor's Flora. He did valuable original work on the sedges and on the Characeæ and we learn from the editor that he " contributed more than any one else to the success the book has had."

There is, of course, much more of Zoology than of Botany in the book, and there is not much about ferns, Hertfordshire not being a fern county. There is, however, an illustration of *Ophioglossum vulgatum* and a note that " several species of fern, once more widely distributed, have become rare or extinct, owing partly to the improved drainage of the land, partly to the disappearance of the woodland in which they grew, and partly to the professional fern hunter. The disappearance of *Asplenium Adiantum-nigrum* is, in one case, known to be attributable to the latter cause."

The book is on the whole a most interesting one to the general naturalist and there is in it something on almost every branch of natural science.

F.W.S.

MR. E. K. BALLS' COLLECTION OF FERNS IN ASIA MINOR.

We have received through Mr. T. B. Blow a number of specimens of ferns collected by Mr. Balls on his recent travels in Asia Minor. The great majority, as might be expected, are British species, but there is one exception to this rule, viz., *Cheilanthes Szovitzii*, a distinctly rare fern of limited distribution. In Europe (proper) we learn from Britten's "European Ferns" it has only been found in Italy and Dalmatia ; but in the Near East and in Asia it appears to be more frequent, as it has been found in Lycia, the Caucasus, and Mount Taurus ; also in Algeria. It has also been brought from Beloochistan and Tibet, ascending in the last named country to seven or eight thousand feet. It is a close relative of that beautiful fern *C. fragrans*, which is one of the most characteristic ferns of the Mediterranean region, but is readily distinguished from it by the ferruginous wool which covers the under surface of the fronds.

Other ferns sent by Mr. Balls are :—

Asplenium Adiantum-nigrum and its variety or relative

A. acutum.

A. Ruta-muraria.

A. trichomanes.

(All apparently identical with the British types.)

Athyrium filix-fœmina, found on stone walls ; more slender and with narrower ultimate segments than as generally seen in this country ; no suggestion of the lush foliose character about it.

Blechnum spicant.

Ceterach officinarum, normal.

Cystopteris fragilis, differing from the British type in the same way as does *Athyrium filix-fœmina.*

Dryopteris (*Lastrea*) *montana*, normal.

Dryopteris propinqua. This seems to have attracted Mr. Balls' attention by its conspicuously large sori. Oddly enough there is neither typical *filix-mas* nor *paleacea.*

Dryopteris (*Polypodium*) *phegopteris.*

Polypodium vulgare and its variety *acutum.*

Polystichum angulare.

Polystichum lonchitis.

Of course the mountainous part of Asia Minor is not a fern region nor was Mr. Balls in primary quest of ferns, but rather Alpine flowering plants. He, however, collected specimens of such ferns as came in his way and the result is interesting.

CULTURE OF ASPLENIUM ADIANTUM-NIGRUM AND OTHER FERNS.

Mr. Elliot speaks of his success with *Asplenium Germanicum* and *septentrionale.* With me, though on several occasions, when I have been on the continent, I have brought back both plants, yet I have always failed to keep them : in two or three years they have disappeared. Now he appears to have failed with *A. Adiantum-nigrum,* a fern of which I am very fond, and whenever I see any wild specimens the least out of the normal I bring them to the garden and, with me, they flourish exceedingly. A deep sunken path with rough broken brick walls runs *due east* and *west* for about 100 yards in my garden and, on the top of the north side facing full south, are small terraces about a foot wide backed with bricks two or three courses high, and close up to the bricks my *Adiantum-nigrum* is planted. When these terraces were built, about 40 years ago, just ordinary garden earth was used, but a top-dressing of leaf-mould and silver sand, with a trifle of bone flour, has been put on year by year—so it is much the same as the locality he describes where he has seen this plant flourishing but has failed when he attempted to imitate it ; he does not mention the aspect however. Many of my plants have fronds over 15 inches high. On the walls of these same little terraces there is an abundance of *Asplenium Ruta-muraria*, planted 30 years ago, and this has flourished and increased—many plants, too, of *A. trichomanes* and several fine specimens of various forms of *Polypodium vulgare* ; also *Ceterach officinarum*—but this is not quite so happy as its companions. There are other ferns too, and, altogether these little terraces are quite interesting and require but little attention.

In another very shady part of the garden I have many large plants of *A. viride* from Ingleborough and there are two or three small plants that I suspect are from self-sown spores ; also nearby is its companion from Ingleborough, *Lastrea rigida*, which grows splendidly at this low elevation, though in the North I think it will not descend below 800 feet—so far my successes.

A regrettable failure with me is a fern which is a great favourite—*Allosorus crispus*, the Parsley Fern, which for years and years I have tried to grow and once or twice thought I had succeeded in making it permanent, but after a few years it disappeared. I suppose it has in dry times received hard water which is fatal to it. Whenever I see my friend Mr. Henwood's fine pot plant of it, always very flourishing, I feel a little envious, but I know his plant has never touched hard water. The past year, with its drought, has been very trying to ferns and, with no water restriction here, I do not think I have lost a fern, but evening and early morning was completely devoted to watering. Here, in Hertfordshire, wild ferns do not greatly flourish—the air is much too dry—and though our Flora records a good number of species (about eight) they are never in quantity nor in such luxuriant condition as in the moister South-West. We would not choose Hertfordshire for one of our annual outings!

T. B. BLOW.

CULTURE OF ADIANTUM-CAPILLUS-VENERIS.

Several correspondents seem to have had difficulty in keeping this species and the communication from Dr. Rowlands in THE GAZETTE for December, 1934, gives some significant hints on the causes of these difficulties. The key to the situation is contained in the sentence, " While the Maidenhair has held its place, as a British fern, for many years, it is essentially a plant of warmer climates than our own." The first necessity then is some amount of artificial heat—sufficient at least to keep the frost at bay. Warmth is needed not only during the winter but through the greater part of spring, and a little is useful during all but the hottest weather in this country. Another important point is to keep the surface of the fronds fairly dry. The name *Adiantum* is derived from a Greek word meaning dry. It may be noticed that, in most of the species of this genus, the fronds have a velvety surface which throws off the water as do the feathers on a duck's back. This peculiarity is, however, less pronounced in *capillus-Veneris* than in many species, and this explains why many people, who have no difficulty in growing *A. cuneatum* in a greenhouse, fail with *capillus-Veneris*, which is at least as hardy if not hardier than *cuneatum.* If *c.V.* be watered frequently overhead the fronds quickly become spotty and gradually turn brown ; often a mould develops on the surface and the fronds die long before they have finished their work. As mentioned in our last issue Dr. Rowlands sent me a small plant of a very interesting form of *c.-Veneris* and, as the whole plant was very small, it was potted, covered by a bell-glass, and placed in a fairly warm room in the dwelling-house. The spottiness spread until the whole of the fronds turned brown in spite of the fact that they were dusted with flowers of sulphur and the inside of the bell-glass was frequently wiped to prevent the air from becoming saturated. New fronds, however, began to come up early in March and have continued to develop and remain green and healthy ; the bell-glass is no longer kept close but is reasonably ventilated and the plant has been removed to an unheated greenhouse which is warmed by the sun although the *Adiantum* is shaded. The plumose and foliose varieties are more liable to this damping off than are the small pinnuled forms. Two or three years ago we made a sowing from *A. c.-V. imbricatum* and a score or so of seedlings resulted. They were very unequal in character. The most promising had deeply incised pinnules and was very thin in texture, while the rest were mostly intermediate between *imbricatum* and the species, though none seemed to be quite normal. One, indeed, was more robust than either the species or *imbricatum* and resembled Lowe's *optandum*, having sturdy erect foot-stalks and relatively small pinnules. This is the only one which now survives, as the whole batch were kept in a cold house, though protected by coverings in frosty weather. The others all died, apparently from inanition before reaching maturity. Many of the choicer varieties of *c.-Veneris* were lost during the war, either from scarcity of fuel or lack of attention, one of those most to be regretted being *Cornubiense*. *Imbricatum* became very scarce and is still in very few collections though, happily, it still survives and may become more plentiful again after a while. The culture of this species is not difficult given sufficient warmth. It needs a fibrous soil of peat and turfy loam, mixed with limestone chippings or broken oyster-shells, and free drainage but percolating moisture.

F.W.S.

FERN GOSSIP.

> “ One night there came in the gay spring time
> A frost o’er the flow’rets bright, and the rime
> Brought death and destruction . . .”

The severe frosts of the night of May 16th caused widespread havoc in the country, especially as coming after an exceptionally mild winter which tempted vegetation to develop prematurely. Much damage was caused among ferns in the open, many of which had half-developed fronds lush and juicy. Some of those in the shadow of walls and fences, but open to the morning sun, were turned into bunches of rottenness, especially *Athyriums*. Some, however, which were wise enough to remain comparatively dormant, have fared better and are now, a fortnight afterwards, beginning to grow again. One of the most tragic cases was a fine foliose acutilobe *Polystichum* intermediate between *angulare* and *aculeatum* found, as a small plant in Cornwall in 1933. This had been kept under cover all through the winter and had half-grown fronds which showed character not dreamed of when it was found and only obscurely hinted at in 1934. It had only recently been placed outside for want of space under glass and it now looks as it had been sprinkled heavily with boiling water. It will presumably recover but will only, at best, be able to do in 1936 what it had set out to do this year.

Mr. Thorrington’s acutilobe (found at Sidmouth last year and dug out of the dry ground practically without roots) has been out of doors all through the winter and spring in the same lattice work shelter in which the Cornish fern was more recently placed. Although it was equally forward it has not been injured at all and now (end of May) has a luxuriant crown of fronds as beautiful, though not quite so large, as those grown in the Devonshire lane where it was found wild.

Another fern, long established in the same shelter, is an old plant of Phillips's *P. angulare rotundatum.* It had only just begun to grow when the frost came, and seemed to receive rather a shock, but it has now started afresh as if nothing had happened. The short young fronds, being sheltered by the luxuriant scales, were protected from injury and just " bided their time."

A pan of seedlings of *Asplenium lanceolatum,* raised from the Saverne form which is supposed to be hardier than the British type, had been under glass through the winter and had made a growth of spring fronds ; this fern had recently been placed outside on the north side of a fence and open to the east wind, with the result that the new fronds were seared and practically destroyed while the older ones, grown last year, were uninjured.

Lastrea montana varieties were outside and were uninjured by the frost but the young fronds have been badly battered by the cutting north and east winds. This is not surprising and it says much for the hardiness of *montana* that they were not cut, although beech and oak trees in the neighbourhood were singed, ash trees were blackened and even the young shoots of ivy were destroyed.

It is curious that a plant of the original *A. f. f. Victoriæ,* which has been grown in a pot and sheltered under glass all the winter, has scarcely moved at all during April and May, although the crown has plumped up slowly and cautiously. Other *Athyriums,* both under glass and outside, are well forward and some have fronds almost fully developed. *Asplenium viride plumosum* has also been very slow in moving and has only begun to show signs of growth within the last ten days, although the old fronds kept green all through the winter and are still fairly fresh. I regard *A. viride* as one of the most difficult of British ferns to cultivate here in the

South and I have quite lost the normal species, probably because it produced spores so freely. No doubt it is easy enough to grow in Scotland and the hilly districts of Northern England. Another thing I find difficult to keep is *Asplenium Adiantum-nigrum grandiceps*, which produces spores very freely, the sori almost covering the under surface of the frond. It is easy enough to raise from spores, however, and I have a fresh batch of sporelings coming on. A sowing of *L. dilatata Boydii* made in December, 1934, is already throwing up fronds abundantly, the only fern sown anything like so recently to do so. I shall be curious to see what the seedlings are like when developed, as *Lastrea uliginosa*, which is *cristata* × *spinulosa*, is very difficult to raise at all from spores and the seedlings are mostly malformed and feeble in constitution, many of them dying in infancy.

Another hybrid fern, *L. remota* (*spinulosa* × *filix-mas*), has only once, over 60 years ago, been known to produce offspring from spores and these are not quite like the parent although they bear more resemblance to it than to anything else.

Polystichum angulare pulcherrimum, H.S. No. 5, which was shown opposite to p. 255 in No. 10 of the present volume of The Gazette is, if possible, better than ever this year, as the segments are longer and more slender, although some of the fronds have been checked in their growth by the biting winds and frost of May. Best of all, it is apparently abundantly fertile though it remains to be seen whether the abundant sori will ripen their spores properly. If a copious crop of characteristic seedlings can be raised from this beautiful fern they should produce a sensation among fern growers and admirers.

F.W.S.

THE SOUTHPORT SHOW AND MEETING, 1935.

We have received a copy of the schedule of prizes, for this year, of the Southport Flower Show. As usual, there are liberal prizes for British ferns in nearly a dozen classes, thus giving opportunities for all classes of growers. We are glad to note that a new trophy—a piece of silver plate, to be won outright—has been presented this year by the proprietors of that enterprising periodical *Amateur Gardening*, London. This is offered to the successful competitor for a group of hardy British ferns, to be arranged in a natural manner in a space of 13 feet by 8 feet.

There is also, in addition to the plate, a first prize of £17 10s. 0d., with second, third and fourth prizes of £15, £12 10s. 0d. and £8 respectively. This class, No. 9 in the schedule, has for several years been the great ambition of hardy fern growers, but, as it involves very considerable labour and expense in conveying and arranging the ferns, as well as some risk of damage to them through being lifted while in full growth, it is only a few who can afford to compete. We hope, however, to see plenty of competition in this, as well as in the smaller classes this year, as usual.

The class for six normal species of British ferns has been retained, though the exhibitors scarcely did it justice in 1934. We trust better efforts will be made, this year, to show what our normal species can do in the way of decoration.

The class for ornamental foliage plants, not in bloom, including palms and ferns, not necessarily hardy, is also retained. It made an effective and beautiful display last year. We hope to see more competition in this class, than formerly, though it is only the comparatively wealthy who can afford to exhibit in it.

A General Meeting of the British Pteridological Society will be held in the Council Chamber at the Town Hall, at 3 p.m. on the second day of the Show (August 29th), the Corporation having kindly offered to lend the room for the purpose. We hope to see a full meeting of members, as it will afford an opportunity to those who were unable to attend the Annual Meeting in June to exhibit and inspect specimens, to compare notes and to express their views. The meeting has been specially arranged for the afternoon in order that members who come from a distance may be able to look around the Show before proceeding to the meeting.

JUST THOUGHTS CONCERNING HARDY FERNS.

In every collection of hardy ferns there are certain plants for which their owner entertains a special affection, and probably there are others which he does not wish to lose because they are considered by all the experts to be of exceptional merit although in his own thoughts he has never got beyond the point of wondering wherein that special quality lies.

Many are the thoughts that cross an enthusiast's mind whilst among his ferns or visiting the collections of friends, and they will frequently revolve around this question : " Why is some particular fern placed upon a lofty pedestal of honour ? " Probably every one of us grows something solely because we are particularly fond of it, yet knowing that every expert who visits us thinks that its presence in our collection betrays a lamentable ignorance of what real quality means. We may find consolation in the fact that we see plants elsewhere which make us wonder why they are not discarded, and probably the reason is the same in every case—there is some sentimental reason which gives them a special place in their owner's affections. After all, we grow our ferns for enjoyment, and the pleasure any plant affords us is of greater importance than its conformity to any standard of perfection that may be set up.

There are some ferns which are so outstandingly beautiful that everyone unhesitatingly accepts them as worthy of their place in the vanguard of "choicest" varieties. *Esplan*, *Bland*, *Baldwinii* among the plumose *Polystichums*, *Clarissima unco-glomeratum* and *velutinum* among *Athyriums*, *Whilharris*, the Cromer form of *Cambricum*, and *Cornubiense trichomanoides* in the *Polypodiums*, *cristatum* (The King) and Wills's *Polydactyla* in the *Lastreas* and such *Scolopendriums* as *speciosum* and Robinson's broad form of *crispum*, are just a few examples of these super excellent varieties which cannot fail to command the warm admiration of the veriest novice. On the other hand there are treasured varieties which no beginner would choose if given a fork and trowel and told to lift the dozen he liked best from any rich collection.

Quite obviously the beginner cannot possess the judgment which can come only of long experience and close study, but one is inclined, sometimes, to think that a collection of the very cream of *congestums*, *fastigiatums*, *muricatums*, *ramo-cristatums* and other extremes in variation from their normal types are worshipped for their freakish, almost immoral behaviour rather than for real merit, which, surely, in a fern should be elegance and beauty from first to last. It has sometimes appeared to me that when one becomes too expert in appraising the quality of a fern he may lose the capacity for enjoying the pleasure of possessing a plant which makes a fine specimen and attracts other people's admiration simply because he constantly sees a vestige of coarseness in the serration of its pinnae, a trifle of irregularity in its tasselled ends which, perhaps, are occasionally polydactylous instead of cristate.

Every enthusiastic pteridologist, I suppose, desires that the cult of British ferns shall extend, that the number of devotees shall increase lest, as the inevitable decrease among the veterans and past-masters maintains its natural course, there may be insufficient recruits and graduates to close in the ranks. That matter has engaged my thoughts a good deal, and my conclusions are that three factors have had a retarding influence upon the progress of British fern culture. The first, although it is mentioned because I am convinced it is a factor, is not, to my mind, of really serious import. I refer to the nomenclature of our finer varieties and distinctive forms which, however readily we sophisticated old hands may smile at the suggestion, does undoubtedly frighten many a beginner from tackling ferns and induces them to go in for dahlias or sweet peas. We can realise that first fright over this matter soon disappears, but do we not sometimes miss excellent opportunities for enlisting recruits through not bothering to explain to an ignoramus something of the meaning of the terms used ? There is no better method of mastering botanical nomenclature than that of learning the meaning of the words which compose a properly descriptive name, but a beginner will not realise this if nobody attempts to explain the point to him.

The second factor that stands in the way of progress is that plain, practical instruction in the cultivation of hardy ferns is among the scarcities of printed matter. My mind goes back to the days when I read lengthy articles about choosing the site for an outdoor fernery, excavating the natural soil, providing perfect drainage, filling in with elaborately compounded compost, and then a lot of generalities which touch upon but do not elucidate the cultural details that are really important. Those articles were written long ago, I have often thought that most of the writers since have saved themselves trouble by merely repeating the story told by the older writers, and that has not carried things much further forward.

There is no need to go to the opposite extreme and say that just any fern, coarse, irregular, grossly inconsistent, should be cherished and retained in a collection that professes to be choice, but the contention is rather that there are among ferns which are held in great esteem some which are really less beautiful than finds and seedlings which are elbowed aside as being " nothing much."

Some who read this may form the conclusion that it is tantamount to self-condemnation because the remedy lies in my own hands. Without any desire to make a jarring noise with my own trumpet I venture to say I have, so far as I am able, endeavoured to provide some practical instruction for those who do not know but wish to learn how to grow ferns. To be perfectly candid the amount of space I am able to give to the subject in the publication under my control is less than I would like it to be. There is a reason for this which may not be apparent to every fern enthusiast. When an article appears in *Amateur Gardening* urging the claims to attention of any particular class of plants, it is bound to follow that many readers seek information as to where those plants are to be bought. They scan our advertisement pages and apart from the regular paragraph from our good friend and fellow member Askew they are unlikely to find hardy ferns advertised. They may inquire of the nurseryman with whom they are accustomed to do business, but here again they are unlikely to find anything much in the way of choice hardy ferns.

That leads me to the third of my trio of factors which hamper the progress of the cult. It is difficult for a beginner to purchase the nucleus of a collection worth establishing.

If I were asked the reason why this is so I should reply it is because nurserymen who run their establishments for a livelihood do not find hardy ferns profitable. If a reason for that statement is required I say it is because every keen enthusiast who has a good collection of choice ferns takes a delight in giving to other enthusiasts every division, offset or seedling of worth that he can spare. That generosity is a very nice trait in the character of the pteridologist, but it does not tend to encourage the nurseryman to cater for fern growers. Furthermore, it keeps the pace at which good things are increased at an extremely slow rate. Nurserymen have the facilities as well as the skill for rapid propagation. Give them, in the first place, the demand for plants and, in the second, stock of the required plants from which to propagate and they will soon effect widespread distribution.

To-day, there are some good collections of hardy ferns in Britain. Their owners are happy in their possession. They may shudder at the mere thought of associating commercialism with their hobby, but will the shudder not be more violent if they visualise a future when none will be there to carry on the cult when they have finished ? Good hardy ferns have got to become an important item in the general nursery trade or they will drop out of cultivation before many more years have passed.

A. J. MACSELF.

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THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

(i) The Study of Species and Varieties of British Ferns ;

(ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette.*

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

F. W. STANSFIELD, M.D., F.L.S.,
120, Oxford Road,
Reading,
Berks.

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